Mitutoyo

Optical Data-processing System
QM-Data200 and Vision Unit

Mitutoyo

Promotes Smart Factory by Collecting and Managing Measurement Data.

Collects data in the inspection process swiftly and accurately, and increases a company's competitiveness based on detailed data analysis.

Optical data-processing system is what supports such a system configuration.

In addition, "**MeasurLink**" offers the "**Quality Control IoT that Mitutoyo advocates.**"

Reduction of measurement time

Measurements that anyone can perform, and with less variation

Quality control based on data management system

Achieve Smart Measurement

2D Data Processing Unit
QM-Data200

Faster, easier, and more accurate measurements with a projector and a microscope.
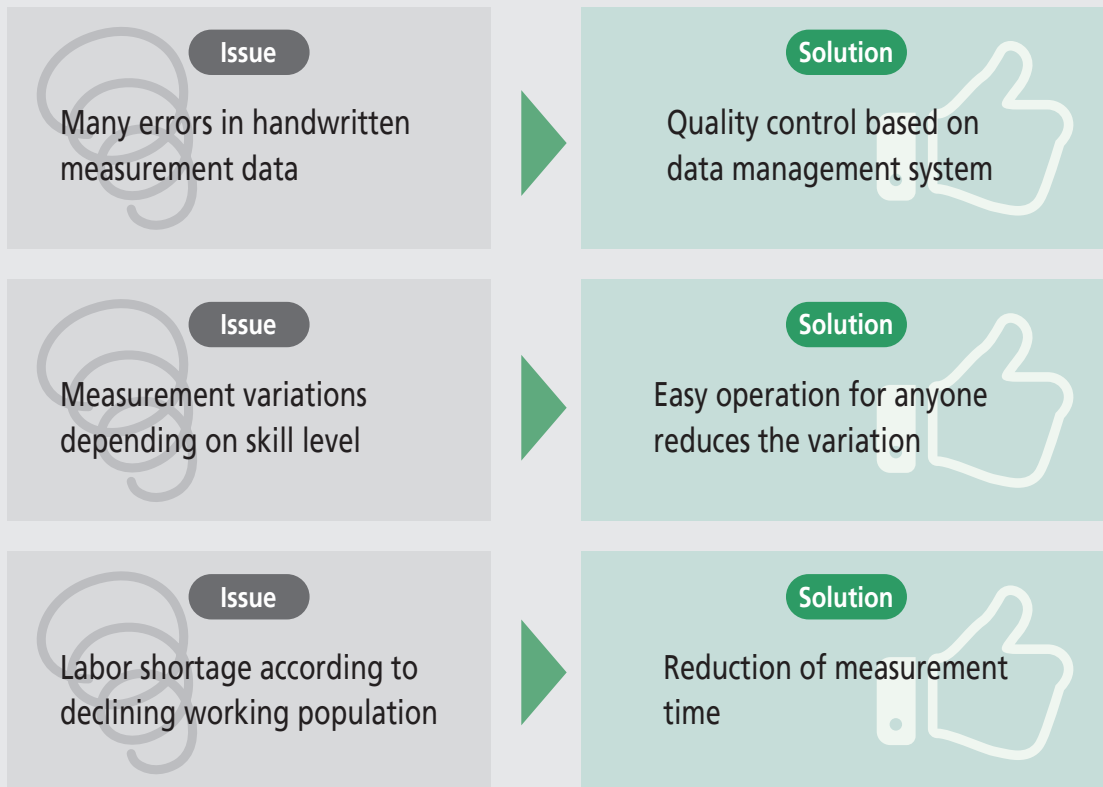
Vision System Retrofit for Microscopes
Vision Unit

Image processing, such as automatic edge detection, offers more efficient and accurate measurements, reducing the operator-dependent variation (reproducibility).
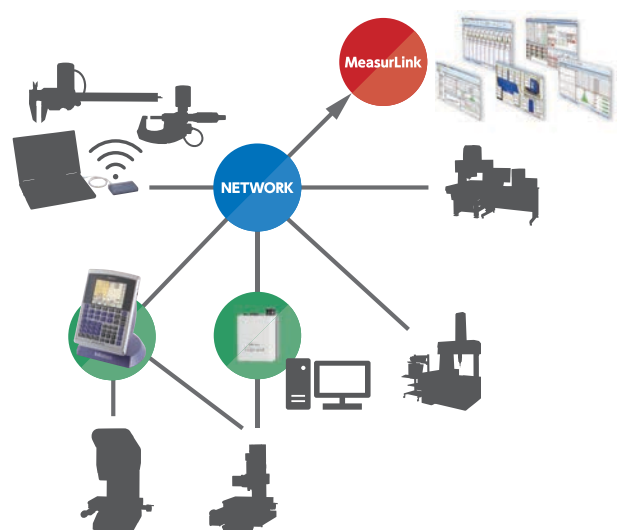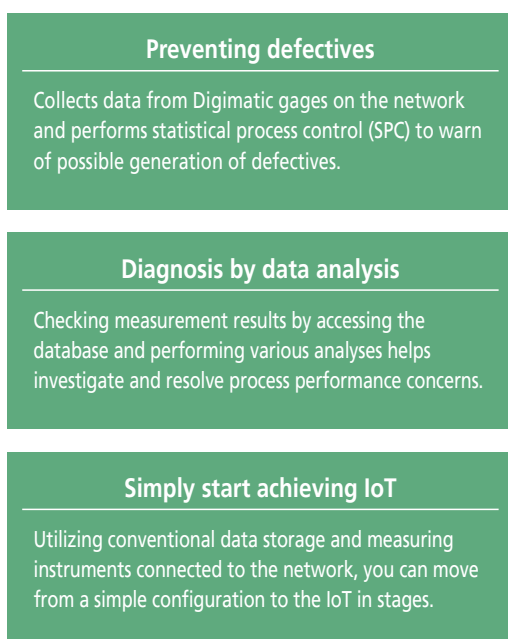

Solutions to issues

Issue
Many errors in handwritten measurement data

▶

Solution
Quality control based on data management system

Issue
Measurement variations depending on skill level

▶

Solution
Easy operation for anyone reduces the variation

Issue
Labor shortage according to declining working population

▶

Solution
Reduction of measurement time

What is **MeasurLink**® ?

MeasurLink is an IoT platform for quality management that realizes "Visualization of Quality" by enabling real-time data collection, centralized data management and implementing statistical process control from measuring instruments connected to the network. **QM-Data200** and **Vision Unit** support you as an infrastructure system that undertakes the collection and management of measurement data from a projector and microscope.

Preventing defectives

Collects data from Digimatic gages on the network and performs statistical process control (SPC) to warn of possible generation of defectives.

Diagnosis by data analysis

Checking measurement results by accessing the database and performing various analyses helps investigate and resolve process performance concerns.

Simply start achieving IoT

Utilizing conventional data storage and measuring instruments connected to the network, you can move from a simple configuration to the IoT in stages.

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NETWORK

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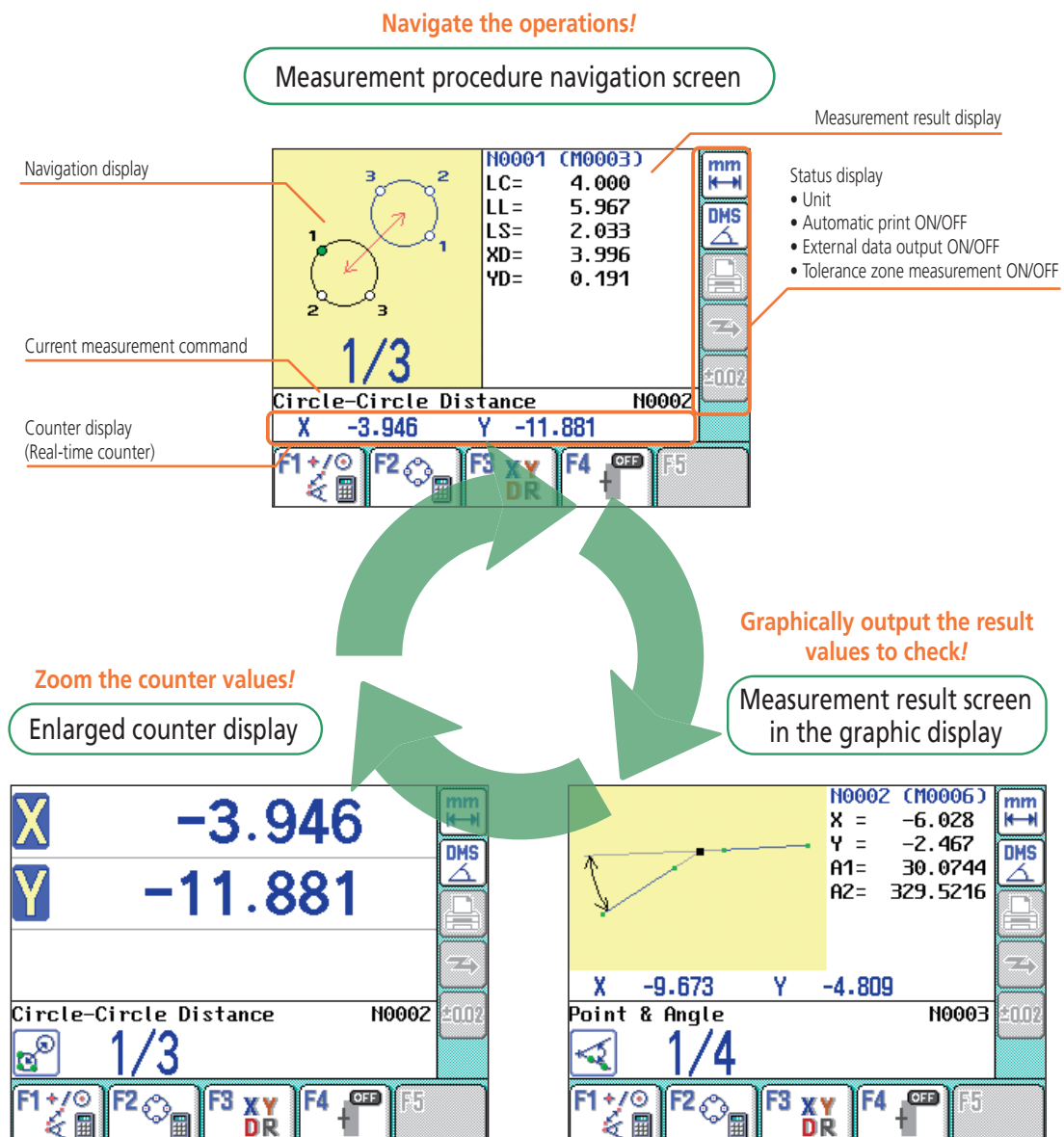
2D Data Processing Unit
QM-Data200

Data Processing Unit with Easy Operation

Easy operation

A color LCD panel with high visibility is adopted for an interactive system that guides the operator according to screen instructions. This allows easy operation even for first-time users of the **QM-Data200**. This data processing unit is intended for production sites in various environments, adopting high durability sheet switches and proprietary electronic components.

### Three screens selectable according to purpose

[Measurement procedure navigation screen], [Enlarged counter display], [Measurement result screen in the graphic display]. Selectable according to your purpose.

Navigate the operations!

Measurement procedure navigation screen

Measurement result display

Navigation display

Status display
• Unit
• Automatic print ON/OFF
• External data output ON/OFF
• Tolerance zone measurement ON/OFF

N0001 (M0003)	
LC=	4.000
LL=	5.967
LS=	2.033
XD=	3.996
YD=	0.191

1/3

Circle-Circle Distance   N0002

X   -3.946   Y   -11.881

Current measurement command

Counter display
(Real-time counter)

Zoom the counter values!

Enlarged counter display

Graphically output the result values to check!

Measurement result screen in the graphic display

X −3.946
Y −11.881

Circle-Circle Distance   N0002
1/3

N0002 (M0006)	
X =	−6.028
Y =	−2.467
A1=	30.0744
A2=	329.5216

X   −9.673   Y   −4.809
Point & Angle   N0003
1/4

Experience measurement with the QM-Data200

The comprehensive key panels of the **QM-Data200** make it easy for any operator to use. Simple operations help you concentrate on measurements.
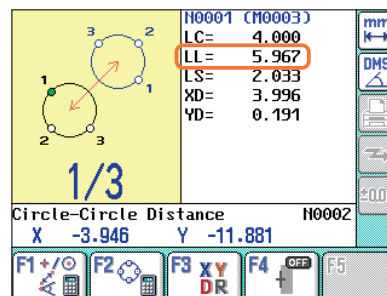
Measurement example: Measure the distance between the centers of holes A and B.
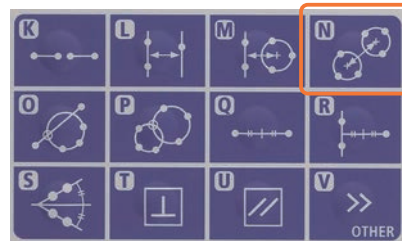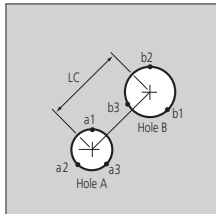
1. Select the "circle-circle distance" measurement key from the pattern-measurement keys.
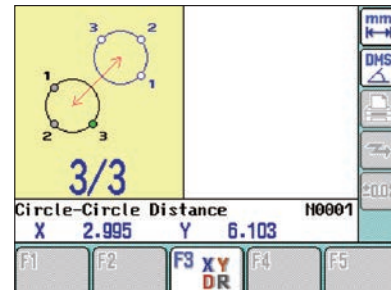
2. Determine each position (a1, a2, a3) on round hole A, following the measurement navigation procedure on the LCD.

4. The measurement result is displayed.

3. Next, the measurement navigation procedure for round hole B will be displayed. Determine each position (b1, b2, b3) in the same manner as in step (2).

USER MENU

In the User menu, the "Measurement command," "User macro," and "Part program" can be registered. (Up to 3 menus.)
You can register a "Part program" for each workpiece to measure, and customize an original system to best suit the operator's needs.
The registered user menus can be saved on a USB storage device, enabling a backup or sharing on multiple **QM-Data200** units.

[USER MENU] key
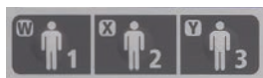
Example of user menu registration
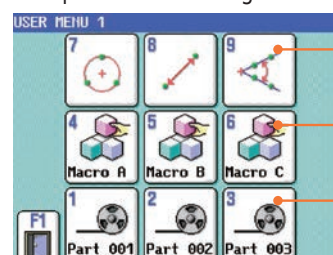
Measurement command
User macro*
Part program

* A user macro is a measurement command created by the user, and is a combination of several standard **QM-Data200** measurement commands.
Note: Up to three user menus, from [USER1] to [USER3] , can be registered.
A maximum of nine icons can be registered for one menu.

Efficiency

The coordinate entry format function (NP measurement)

In a measurement using the coordinate entry format, the coordinates calculated from the measurement data (coordinates of the center of a circle, etc.) are applied to data entry as one measuring point. For example, measurement of the pitch of a rectangular hole can be executed simply by selecting the [PITCH MEASUREMENT] key and [RECTANGULAR HOLE CENTER] in the coordinate entry format. Without calling up and re-calculating measurement result, [COORDINATE ENTRY FORMAT] can use with pattern and basic measurements.

Measurement example:

Measurement of a pitch circle whose perimeter intersects the three hole centers
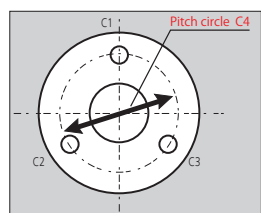
Types of coordinate entry formats

|			
Directly entered points Use the point that has been entered as a measuring point.	**Center of ellipse** Use the center of the ellipse as a measuring point.	**Midpoint between the two** Use the midpoint between the two points as a measuring point.	**Center of rectangular hole** Use the center of the rectangular hole as a measuring point.
Center of circle (three points) Use the center of the circle whose 3 points have been entered as a measuring point.	**Center of slotted hole** Use the center of the slotted hole as a measuring point.	**Center of circle (four points)** Use the center of the circle whose 4 points have been entered as a measuring point.	**Intersection of two straight lines** Use the intersection of the two straight lines as a measuring point.

1. Press [CIRCLE MEASUREMENT] to measure pitch circle C4.

2. Press [COORDINATE ENTRY FORMAT].
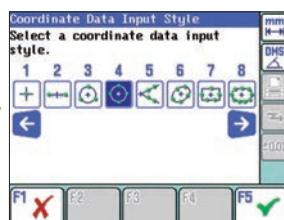
3. Measure circle C1 (entry of four points). Likewise, measure circles C2 and C3.
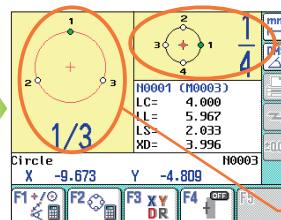
4. Select the center of each circle (entry of four points).

Coordinate entry format display

The diameter of the pitch circle (C4) can now be found.

Measurement status of pitch circle display

Manual Operation Functions for Greater Measuring Efficiency

## Navigation of measuring position

When using the Repeat function to execute a measurement procedure (part program) created with the teaching function*, the Repeat function guides the operator to the next measuring point. The number of repeat times for a part program can be specified.

Current coordinate
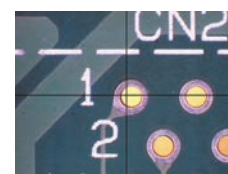
Next measuring point
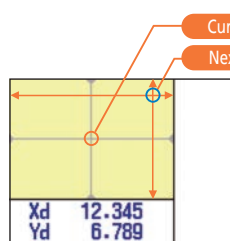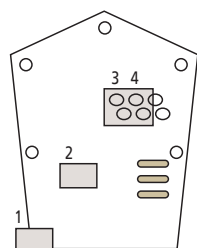
1. The next measuring point is indicated by the cross-hairs.
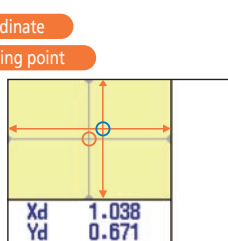
2. Move the measuring instrument stage to place one set of cross-hairs over the other (or to bring the counter reading to zero).
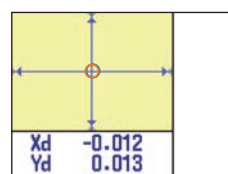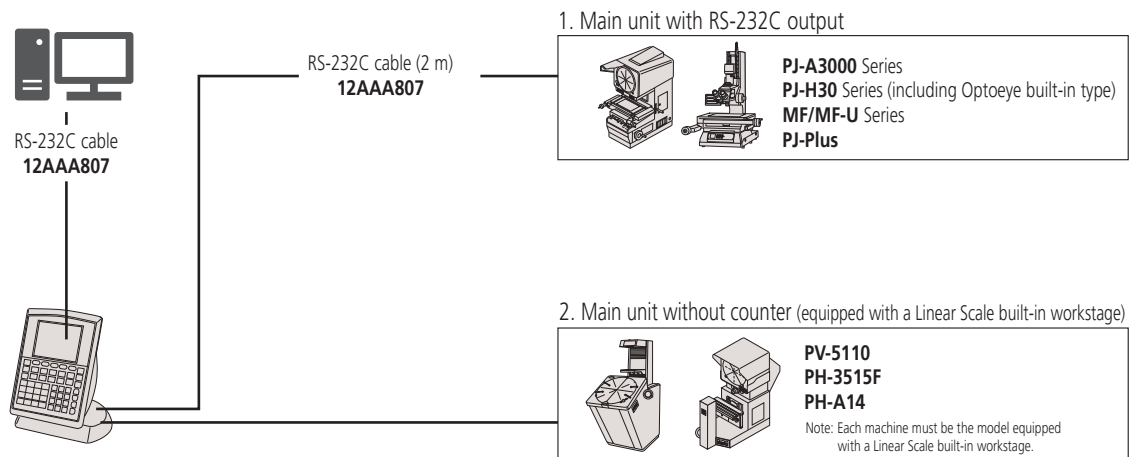
3. When the cross-hairs overlap, it is close to the next measuring point.

4. Press [LOAD] to enter data, using the cross-hairs of the measuring instrument.

* Teaching function: When measuring more than one workpiece of the same form, the series of key operations performed in the measurement of the first workpiece can be stored as a part program.
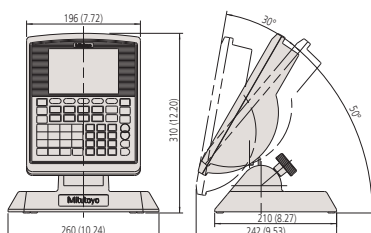
SYSTEM CONFIGURATION

RS-232C cable
12AAA807

RS-232C cable (2 m)
12AAA807

1. Main unit with RS-232C output

PJ-A3000 Series
PJ-H30 Series (including Optoeye built-in type)
MF/MF-U Series
PJ-Plus

2. Main unit without counter (equipped with a Linear Scale built-in workstage)

PV-5110
PH-3515F
PH-A14

Note: Each machine must be the model equipped with a Linear Scale built-in workstage.

Specifications

Model	QM-Data200	
Order No.	Stand-mount type	Arm-mount type
	264-155*[1]	**264-156***[1]
Display languages (selectable)	Japanese/English/German/French/Italian/Spanish/Portuguese/Czech/Simplified Chinese/ Traditional Chinese/Korean/Turkish/Swedish/Polish/Dutch/Hungarian	
Measured value units	Length: mm/in Angle: degree/degree minute second (selectable)	
Resolution	0.1 µm	
Program functions	Part program creation, execution, editing	
Statistical processing	Number of data, maximum value, minimum value, mean value, standard deviation, range, histogram, statistics on a measuring function basis (by command)	
Display system	COLOR TFT LCD (with LED backlight)	
ABS (Absolute origin)	—	
LAF (Laser AF)	—	
Edge Sensor Position Compensation	Supported (Projector)	
Input/Output	X, Y, Z: Maximum of three Linear Scale Inputs RS-232C 1: For connecting to external PC RS-232C 2: For connecting to counter of measuring instrument OPTOEYE: For inputting edge signal from OPTOEYE (OPTOEYE M2)	FS: For connecting to optional foot switch PRINTER: For connecting to optional printer USB-MEMORY: For connecting to USB memory*[2]
Measurement result file output	RS-232C output (CSV format, MUX-10 format)	
Power	AC100 - 240 V	
Maximum power consumption	17 W (does not include optional accessories)	
Dimensions (W×D×H)	Approximately 260×242×310 mm (including the stand)	Approximately 318×153×275 mm (when the arm is in the horizontal posture)
Mass	Approximately 2.9 kg	Approximately 2.8 kg
Applicable models	**PJ-A3000** Series **PJ-H30** Series **PH-3515** **MF/MF-U** Series **PJ-Plus** **PH-A14** **PV-5110**	**PJ-A3000** Series **PJ-H30** Series **PV-5110** **PH-3515** **PJ-Plus** **PH-A14**

*1 To denote your AC line voltage add the following suffixes (e.g. 264-155A) A for 120 V, C for 110 V, D for 220 V, E for 240 V. No suffix is required for 100 V.
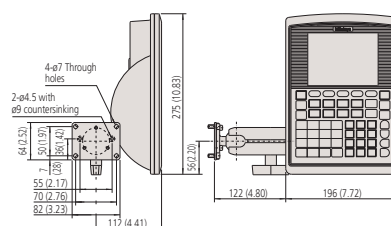*2 Mitutoyo does not guarantee the operation of all commercial USB memories except for the following:
  Mitutoyo recommends those USB memories made by SanDisk Corporation and that meet the following requirements.
  - Those that have no security function such as encryption and fingerprint authentication
  - Those that are not compliant with USB3.0

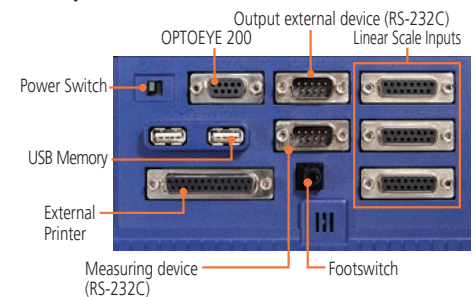### Rear panel of QM-Data200

OPTOEYE 200
Output external device (RS-232C)
Linear Scale Inputs
Power Switch
USB Memory
External Printer
Measuring device (RS-232C)
Footswitch

Dimensions

• Stand-mount type (Order No. **264-155A**)

196 (7.72)
30°
310 (12.20)
90°
260 (10.24)
210 (8.27)
242 (9.53)

• Arm-mount type (Order No. **264-156A**)

4-ø7 Through holes
2-ø4.5 with ø9 countersinking
275 (10.83)
64 (2.52)
50 (1.97)
86 (4.2)
7
28
55 (2.17)
70 (2.76)
82 (3.23)
560 (20)
122 (4.80)
196 (7.72)
112 (4.41)

Key panel

Basic element measurement

Coordinates entry format

Creating the coordinate system

Pattern measurement

User menu

Display screen:

N0001 (M0005)
LC=   5.658
LL=   7.627
LS=   3.689
XD=   4.005
YD=   3.997

Circle-Circle Distance   N0002
X   5.544   Y   10.879

1/3

QM-Data200

275 mm (10.83 inch)

196 mm (7.72 inch)
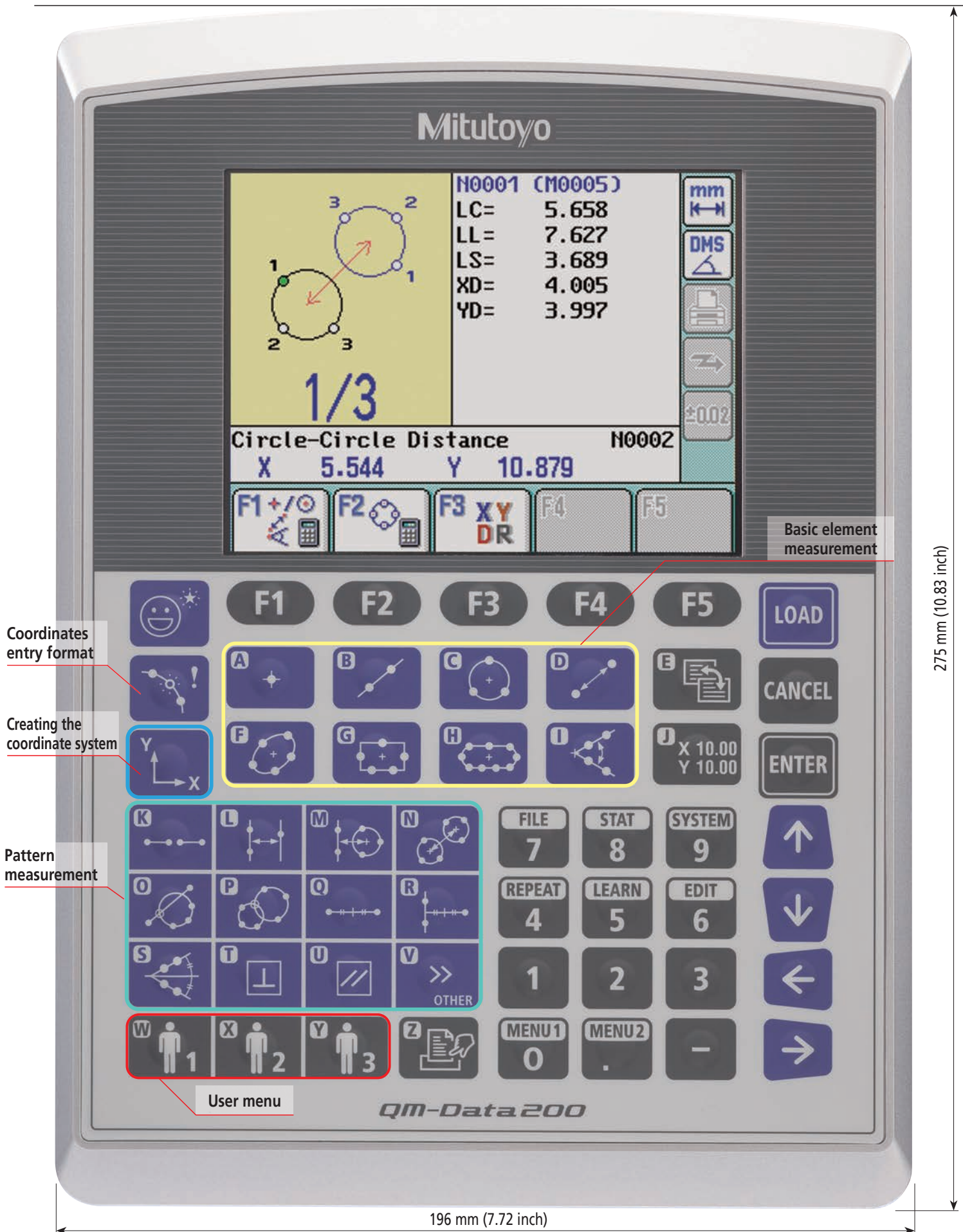
Creating the coordinate system and measurement commands

Creating the coordinate system

Key menu

Coordinate system pattern 1
The line that passes the measuring point is the X axis, and the line that passes through another measuring point and intersects the X axis making a 90-degree angle is the Y axis.

Coordinate system pattern 3
The line that passes through the measuring point is the X axis, and the intersection with another line is the origin.

Coordinate system handling
Save, recall and Reset the coordinate system

Compensation of plane
Reduce the error caused by the inclination of workpiece setting. (effectively used by measuring machines with a Z axis.)

Origin setting
Translate the coordinates horizontally until the measuring point is positioned as the origin. The displacement value can be entered directly.

Determining axis by line
Rotate the coordinate system in such a way that it becomes parallel to the measured line. (The origin is not transferred.)

Coordinate system saving
Save the current set coordinate system information in a coordinate system memory. (The number of memories is 10.)

Coordinate system pattern 2
The line that passes through the measuring point is the X axis, and its midpoint is the origin.

Coordinate system pattern 4
The measuring point is the origin, and the line that passes through another measuring point is the X axis.

Coordinate system recall
Recall a coordinate system data from a coordinate system memory, then set it in the measuring target coordinate system.

Determining axis by point
Rotate the X axis coordinate in such a way that it passes through the measuring point. (The origin is not transferred.) The rotation angle can be entered directly.

Compensation of offset axis
Rotate the coordinate system until the measuring point comes to the specified position. (The origin is not transferred.)

Coordinate system resetting
Clear the current coordinate system setting, then reset it to the initial status just after power-on.

Basic element measurement

Point
Coordinates (Multi-point processing for a maximum of 100 points)
Note: In multi-point processing, the mean value is used as the measured value.

Ellipse
Center coordinates, major-axis diameter, minor-axis diameter, angle with the X axis, departure from the X axis (Multi-point processing for a maximum of 100 points)

Line
Angle and perpendicularity with the X axis. (Multi-point processing for a maximum of 100 points)

Rectangular hole
Center coordinates, length, width

Circle
Center coordinates, diameter, roundness (Multi-point processing for a maximum of 100 points)

Slotted hole
Center coordinates, length, width, radius of slotted hole

Point-point distance
Distance, Coordinates difference, radial difference

Intersection point and intersecting angle
Intersection coordinates, intersecting angle, supplementary angle

Pattern measurement

Pitch
Point-point distance, difference between coordinates, angle, cumulative distance, cumulative angle

Line-circle intersection
Coordinates of intersection

Center line between line-circle
Angle with the X axis

Line-point distance
Perpendicular (shortest) distance

Intersection of circles
Coordinates of intersection

Perpendicularity
Perpendicularity

Line-circle distance
Center-center distance, longest distance, shortest distance

Midpoint between points
Coordinates of midpoint

Parallelism
Parallelism

Circle-circle distance
Center-center distance, longest distance, shortest distance, difference between coordinates, radial difference

Midpoint between line and point
Coordinates of midpoint
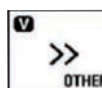
Key menu

Circle-point distance
Center-center distance, longest distance, shortest distance, difference between coordinates

Circle-circle tangent line
Angle with the X axis

AI
With the AI measurement function (Automatic Element-Identification function), elements can be automatically identified based on data input from the measuring points.

Midpoint between circles
Coordinates of midpoint

Corner
Diameter, radius of corner circle, center coordinates

Projected point
Coordinates of the point projected on a line

Height
Height (distance between steps in the Z axis direction)

Point-circle tangent point
Coordinates of tangent point

Plane-plane distance
Distance between plane and plane (point)

Mitutoyo

System example
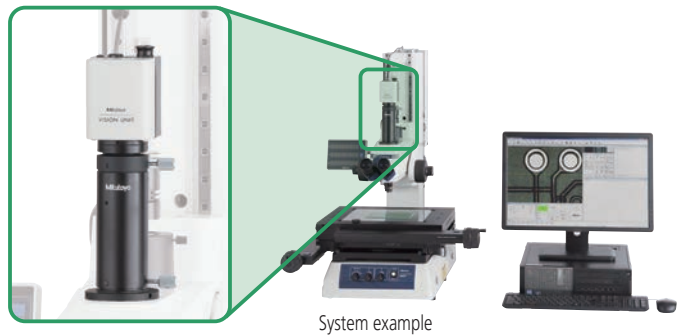
Greatly Improved Workability by Data Processing Plus Image Measurement

### Improved measurement reproducibility and efficiency

The vision unit allows anyone to perform quicker and more repeatable detection of an edge with just one click, resulting in much better reproducibility of dimension measurement among a group of operators. Also, using the vision unit eliminates the need for burdensome workpiece orientating and measuring-point detection with cross-hairs, thus allowing quicker inspection of dimensions.

Actual measurement results and measuring times when measuring a dimension of about 20 mm by a group of three operators

Unit: μm   **About 90 % improvement** in reproducibility
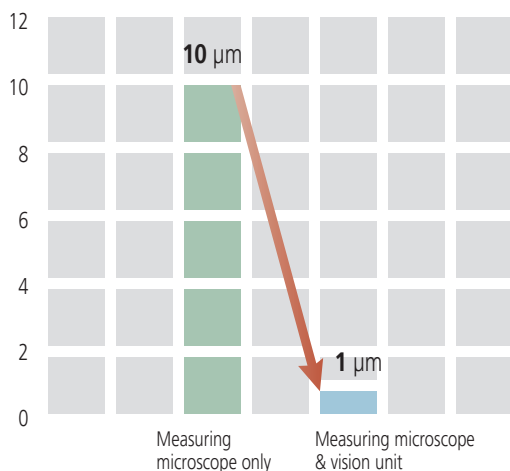
Unit: sec   **About 70 % reduction** in average measuring time
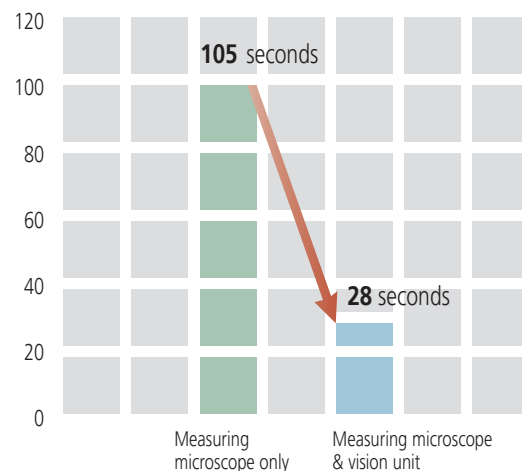
Group measurement with the measuring microscope only

	Operator A	Operator B	Operator C		
Maximum value (mm)	20.0863	20.0849	20.0811	Group maximum value (mm)	20.0863
Minimum value (mm)	20.0765	20.0802	20.0758	Group minimum value (mm)	20.0758
Reproducibility (mm)	0.0098	0.0047	0.0053	Group reproducibility (mm)	**0.0105**
Measurement time (sec)	76	150	89	Avereage measurement time (sec)	**105**

Group measurement with the measuring microscope & vision unit

	Operator A	Operator B	Operator C		
Maximum value (mm)	20.0847	20.0853	20.085	Group maximum value (mm)	20.0853
Minimum value (mm)	20.0846	20.0842	20.0837	Group minimum value (mm)	20.0837
Reproducibility (mm)	0.0001	0.0011	0.0013	Group reproducibility (mm)	**0.0016**
Measurement time (sec)	36	23	25	Avereage measurement time (sec)	**28**

More User-friendly Manual Measurement Environments Available

Wide-field measurement

Upsizing of the image sensor has made the view approximately 40% wider than previously in both the X and Y directions, thus allowing concurrent observation of the whole extent of many more target areas than before.
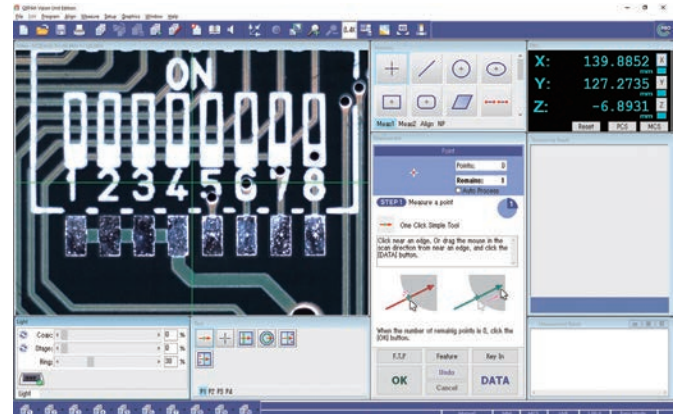
Note: An actual image using objective lens ML1X plus LED ring light

Digital zoom function

A normal 0.4X display image can be magnified to a 1X or 2X image by merely clicking the corresponding menu icon.
The image can be measured in fine detail using the digital zoom display.

0.4X

1X

2X

Auto-brightness control function (exclusive to MF/MF-U Series)

The light intensity of transmitted/reflected illumination used on a microscope can now be controlled via software. There is no hassle adjusting the illumination during repeat measurements, since the level is reproduced according to the setting selected during creation of the part program. Even in the measurement of a workpiece that requires variations in illumination, consistently accurate edge detection is ensured. This enhances the efficiency of repeated measurements. This function can be used even when an external lighting system, such as a ring fiber or an LED ring (either one is optional), is connected.

Note: Only for Measuring Microscopes **MF/MF-U** Series
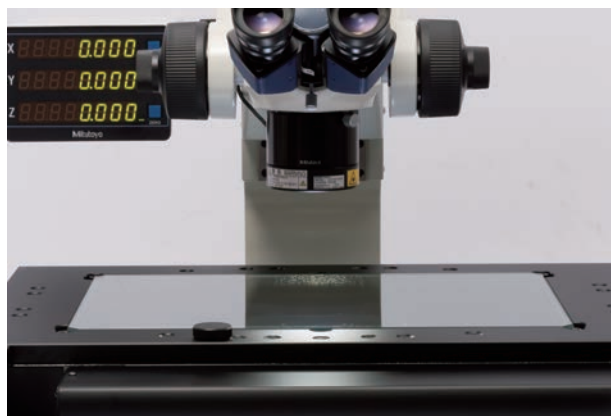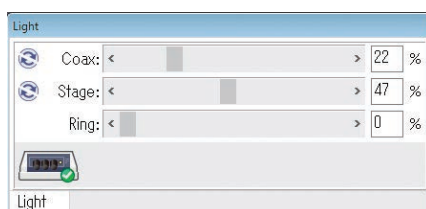
Software

QSPAK Supports A Wide Variety of Measurements.

QSPAK, which is software for the image unit, offers "Reliable image detection capability" and "Simple operability for anyone" to support a wide variety of measurements, from measurements of single workpieces in production of various kinds and small quantities to fast measurements of mass produced items.
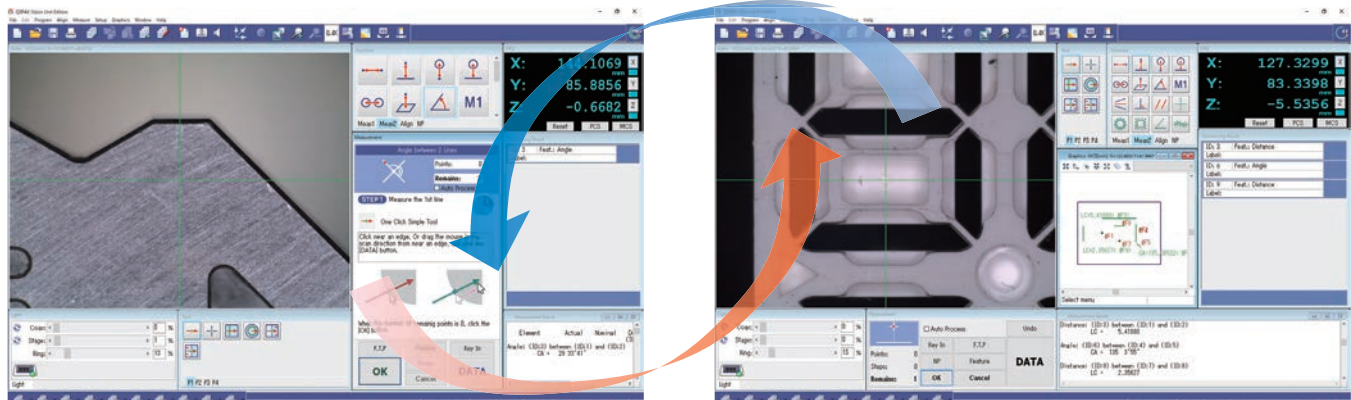
QSPAK, which combines the two modes, offers strong backup to customers in various scenarios.

EZ mode
(Simple measurement mode)

PRO mode
(Universal measurement mode)

A Tool Enabling Quick and Simple Inspection of Measurement Results

Measurement results display function on a video window

Just looking at a measurement image lets you understand the measurement result intuitively. Immediate judgment for tolerance and identification of NG parts is possible by setting different display colors for results between OK and NG. Adding a measurement image to an inspection record leads to higher efficiency in document preparation work.
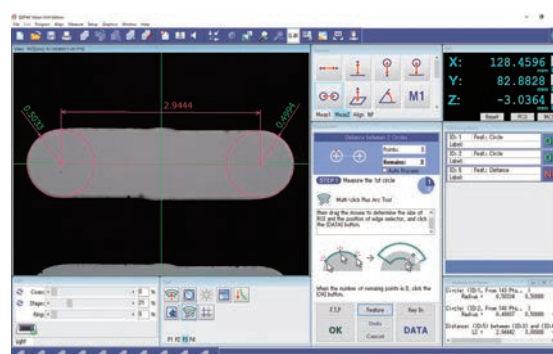
Freely set any display colors for OK/NG

Examples
Tolerance OK: Green
Tolerance NG: Red

Tools for Reducing Personal Errors and Improving the Accuracy of Repeat Measurements

One-click tools

Just single-clicking around the edge with a mouse sets the automatic discrimination from automatic tool setup to edge detection/calculation. If measurement is performed in a single window, measurement time can be drastically reduced since there is no need for stage travel.
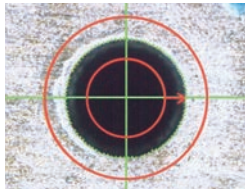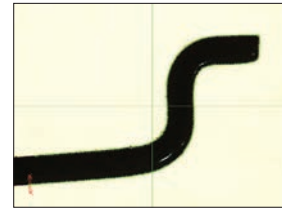

One-click circle tool
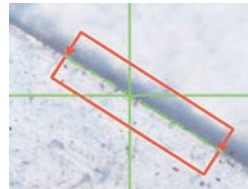
One-click box tool

Auto Trace Tool

This is a tool to perform shape measurement by instantaneously detecting multiple points along the edge of an arbitrary form. The contour data in the window is acquired by autonomous profiling measurement.

If the acquired contour data are imported to the contour analysis software "**FORMTRACEPAK-AP**" (option), highly accurate contour analysis can be performed.

Note: For details of **FORMTRACEPAK-AP**, see page 16.

Useful Tools Supporting Measurement of Various Features

Multi-click plus arc tool

This tool allows for arbitrary setting of the entire tool size to be drawn, scanning direction, and position of the edge selector.
It is useful for measurements of a narrow-angle arc, or a contour that is hard to recognize due to having too many abnormal points.

Roundness tool

Roundness of circular features is calculated using the least-squares method by default but the maximum inscribed circle or minimum circumscribed circle methods are also available.

Template tools

Basic templates
The tool provides three types of templates corresponding to the reticles of a measuring microscope.
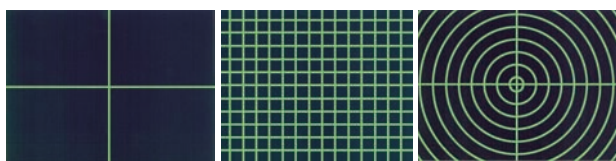

| Cross-hairs | Grid | Concentric circles |

Manual pattern matching
This tool creates a template that matches a workpiece feature exactly in the case of no match in basic/extended templates so that tolerance zone judgment can be performed visually. The displayed lines of the upper and lower limits entered with keys allow easy confirmation at a glance.

Upper limit
Nominal data
Lower limit
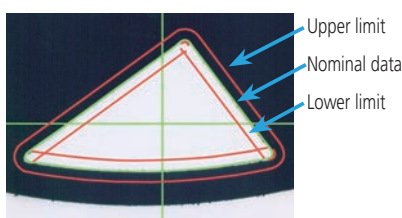
Extended templates
Four kinds of templates are available as the extended templates: cross-hairs, circular, rectangular, and angular. This tool allows free setting of values such as diameter, distance and angle through key entry on a profile projector.
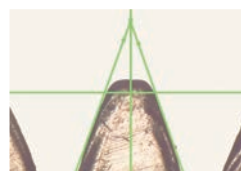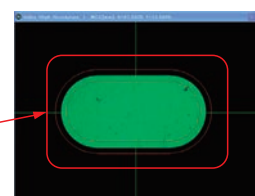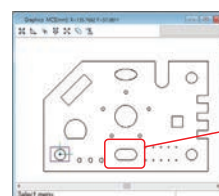

Angle template

Circle template

CAD user pattern template function
This tool allows a creation of a template by using a drawing in a graphics window (CAD data).

Note: To use this function, **QS-CAD I/F** (optional software) is required.

Useful Functions for Easy Execution and Editing of Auto-Measurement Procedure Program

## One-click easy execution function   Program launcher

It is now possible to register an auto-measurement procedure program created with pictures and comments in an icon, and easily recall a required program. A total of 10 icons are available, enabling the management of programs by each worker or workpiece.


Program launcher icons
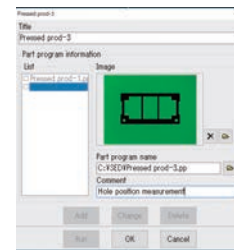
Auto-measurement procedure program storage window

Smart Editor enabling intuitive program editing

During display of the list of the part programs (auto-measurement procedure program), the target position of X/Y stage travel, lens magnification, and illumination condition are displayed independently as icons or on labels, to facilitate part program editing.
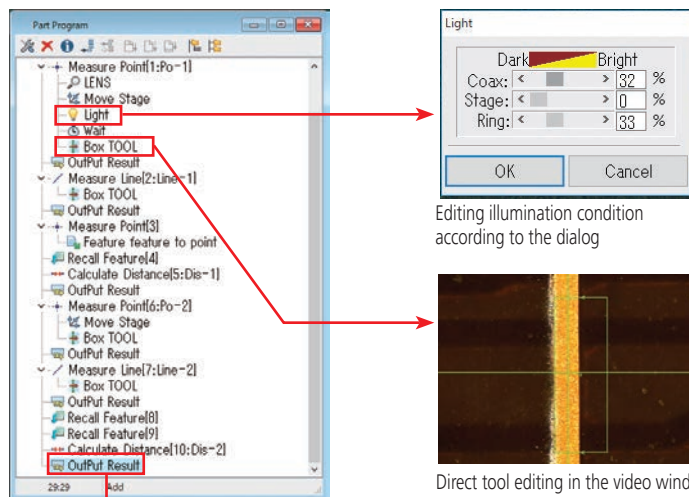
Editing illumination condition according to the dialog
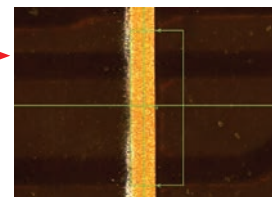
Direct tool editing in the video window
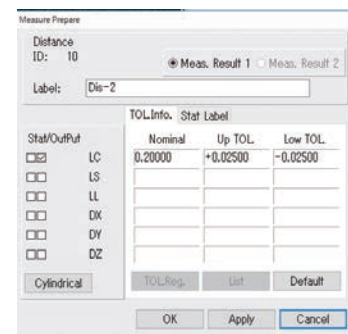
Editing design value and tolerance according to the dialog

Navigation Functions for Faster Measurement
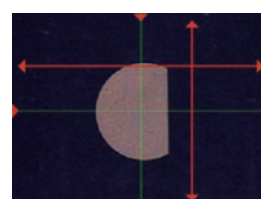
Stage navigation

When indicating a point to measure in the graphics window with the mouse, the cross-hairs navigation appears. This helps to minimize unnecessary travel of the X/Y stage, such as overrun or short-run. Combination of this function and CAD data* remarkably reduces the measurement program creation time. Furthermore, measurement results are displayed in the graphics window, allowing easy travel to the position you want to re-measure.

* To use CAD data, **QS-CAD I/F** (optional software) is required.

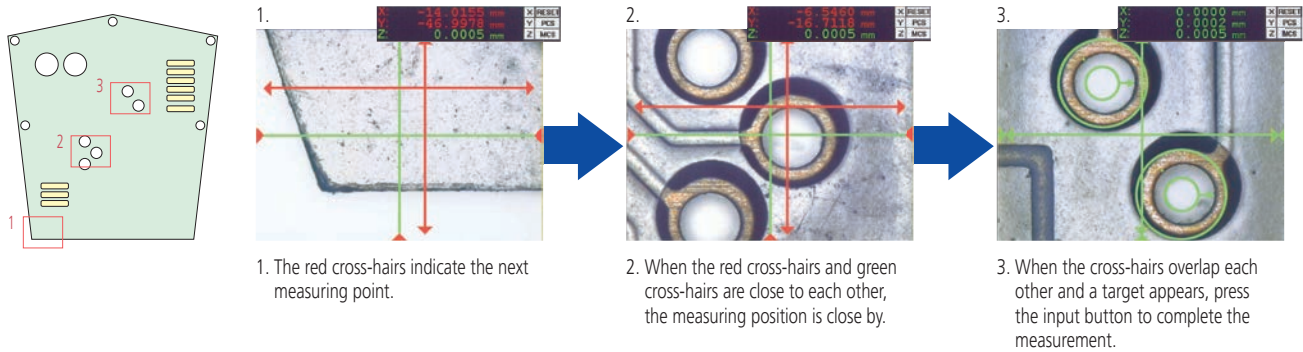**Stage travel on graphics window**
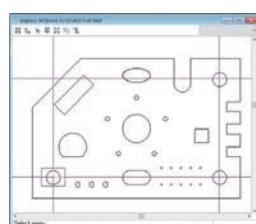
The destination will be indicated by the cross-hairs on the video window.

Quick Navigation

The navigation function is combined with the teaching and repeat functions, by which a series of measurement procedures is memorized and reproduced. This function guides the operator to the next measuring point, following the measurement procedure that has been memorized. Move the stage until the green cross-hairs, seen at the center of the monitor screen, are superimposed on the red cross-hairs, which indicate the next measuring point, and only the green cross-hairs remain. In this state the next measuring point will be displayed on the screen. As the digital counter approaches zero, the screen will display the next measuring point. This eliminates the need to constantly look at the workpiece in order to check the measuring point, thereby freeing the operator to concentrate on the screen displays.

1. The red cross-hairs indicate the next measuring point.

2. When the red cross-hairs and green cross-hairs are close to each other, the measuring position is close by.

3. When the cross-hairs overlap each other and a target appears, press the input button to complete the measurement.

Support from Inspection Table Generation to Measurement Control

Graphics window

The real-time graphic display of measurement result and element provides a visual image of the measuring point. Also, the graphic display of measuring elements facilitates the selection of a measuring element, making for a quicker measurement process. Inter-element calculations can be performed by using the graphics window.
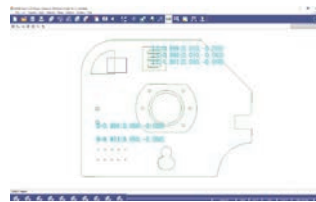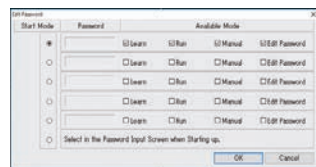

Icon editor

Using the Icon Editor, the layout of icons such as the measurement item icon, tool icon, etc., can be freely arranged. The layout setting can be freely determined. For example, frequently used icons can be laid out on just one page.


Security function

The scope of use can be limited according to the work level, by setting a password when starting **QSPAK**.


Video image scale display

The scale display, which is proportionate to the real field of view, on the video window lets the operator quickly grasp the approximate size of a workpiece. The image can be saved along with the scale display for size reference.
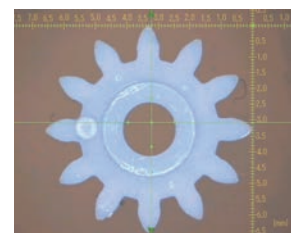

Saving image files

The color image on the video window can be output as files in BMP-format and JPG-format. They can be easily attached to the workpiece image record or inspection table.
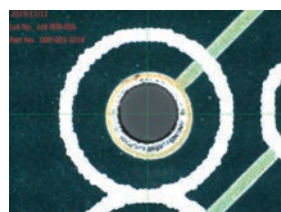
Measurement result output

Measurement results using the part program can be output as CSV-format files. This means the measurement result can be output to a commercial spreadsheet program such as MS-Excel®, so that an inspection table can be generated in the original format.

Mitutoyo
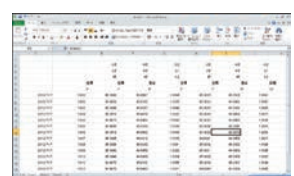
A Group of Applications Supporting Advanced Measurement Requirements (Optional software)

## Form assessment/analysis software

FORMTRACEPAK-AP

FORMTRACEPAK-AP is software for form evaluation and analysis, that performs evaluation of geometrical tolerances, profiles and complex shapes, making use of point group data acquired with an auto trace tool, etc.

Note: The auto trace tool is executed in the tool window.

Example of complex shape analysis

• Measurement of a complex shape displayed in the window is possible with a simple operation.
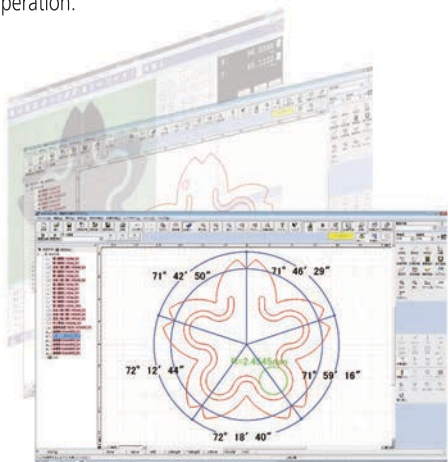
Example of gear contour matching and over-pin diameter analysis

• Contour tolerancing against the nominal value is also enabled.
• Allows the definition of a virtual circle with a given diameter.
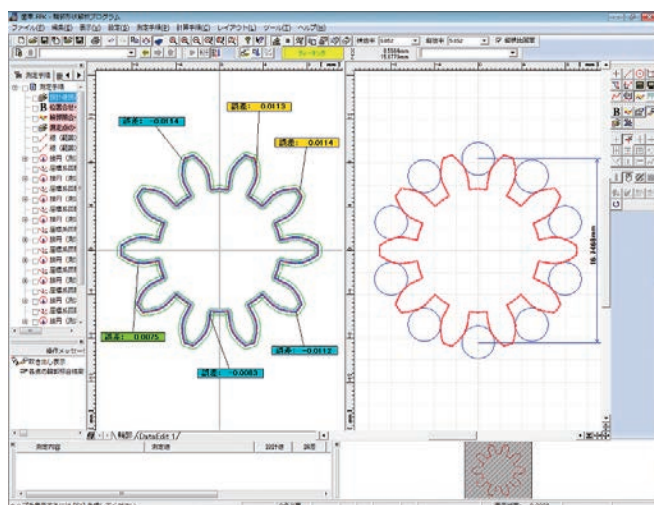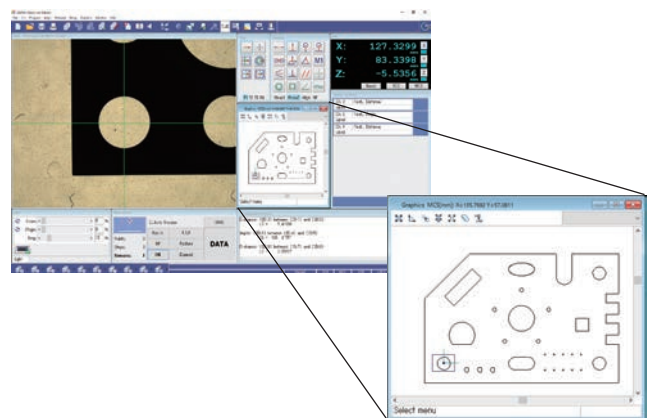

Measurement support software

QS-CAD I/F

"CAD Import function" for importing CAD data, and "CAD Export function" for exporting CAD data are available.
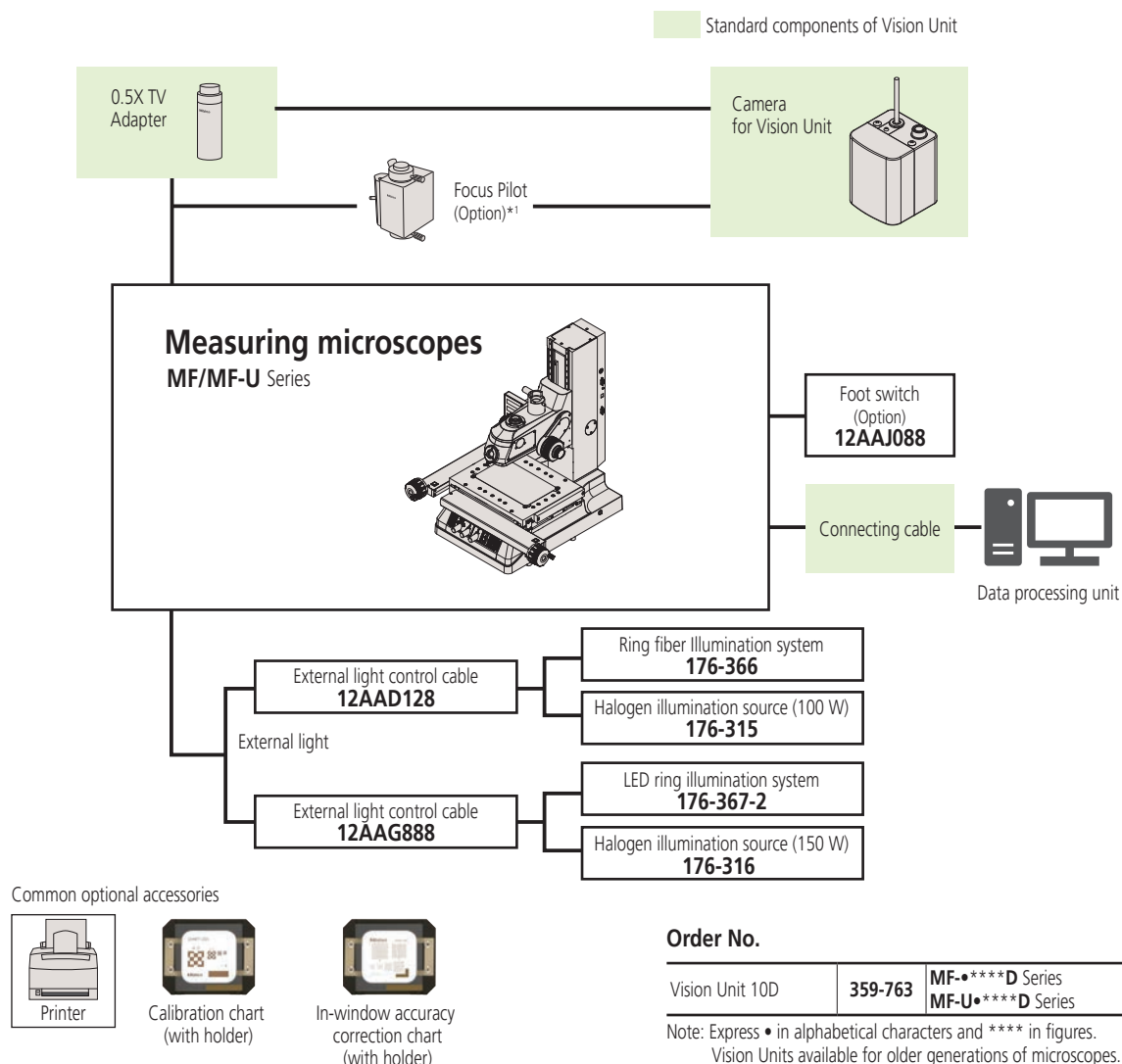
The CAD import function makes it possible to import CAD data to utilize it for stage travel or nominal value inputting. The CAD export function makes it possible to export the graphic data, nominal values, and measurement values acquired from a measurement unit, to an external CAD system.

Functions

• CAD data can be displayed in the graphics window.
• The nominal value of each measuring item is entered automatically.
• Travel to a desired position on CAD data can be displayed on the stage navigation window.
• Graphics data can be output in a specified CAD data format.

SYSTEM CONFIGURATION

Standard components of Vision Unit

- 0.5X TV Adapter
- Camera for Vision Unit
- Focus Pilot (Option)*1

Measuring microscopes
MF/MF-U Series

- Foot switch (Option) **12AAJ088**
- Connecting cable
- Data processing unit

External light
- External light control cable **12AAD128**
  - Ring fiber Illumination system **176-366**
  - Halogen illumination source (100 W) **176-315**
- External light control cable **12AAG888**
  - LED ring illumination system **176-367-2**
  - Halogen illumination source (150 W) **176-316**

Common optional accessories

- Printer
- Calibration chart (with holder)
- In-window accuracy correction chart (with holder)

Order No.

Vision Unit 10D	**359-763**	**MF-•****D** Series **MF-U•****D** Series

Note: Express • in alphabetical characters and **** in figures.
Vision Units available for older generations of microscopes.
Contact Mitutoyo for details.

Specifications

Image detection camera	Image sensor	1/2-inch color CMOS with 3 megapixels
	External dimensions/Mass (camera only)	56 (W) × 54 (D) × 78 (H) mm/0.4 kg
	Optical system magnification	0.5X (0.5X TV adapter supplied standard)
PC	OS	Windows 10 64 bit
	Monitor	22 inch
	Software	**QSPAK** Vision Unit Edition Ver 6.0
	Maximum power consumption	Max. 273 W (including monitor) Note: 703 W at max. (including monitor) for the Vision Unit 7D
	Monitor magnification	Approximately 19X (3X objective lens is used: approx. 57X/imaging range: 4.49 × 3.36 mm)
	Resolution	0.1 µm (0.01 µm if connecting to Hyper MF/MF-U)
	Axial length measuring accuracy*2 (Measuring condition: 20 ºC)	Depends on the accuracy of the measuring microscope.
	Repeatability*3 (Measuring condition: 20 ºC)	Depends on the accuracy of the measuring microscope. Reference: Repeatability on one screen (when Mitutoyo's standard test piece is used) 3X objective lens is used: $3\sigma=\pm2.5$ µm or less, 10X objective lens is used: $3\sigma=\pm1.0$ µm or less

*1 Focus pilot is dependent on the Focus Detection Unit. The unit can detect a focus position at high accuracy and with high repeatability.
*2 This measuring accuracy means a difference between an actual measurement value in vision measurement and a true value.
*3 Repeatability on one screen means the variation in measurement values when different positions within the same screen are measured repeatedly.
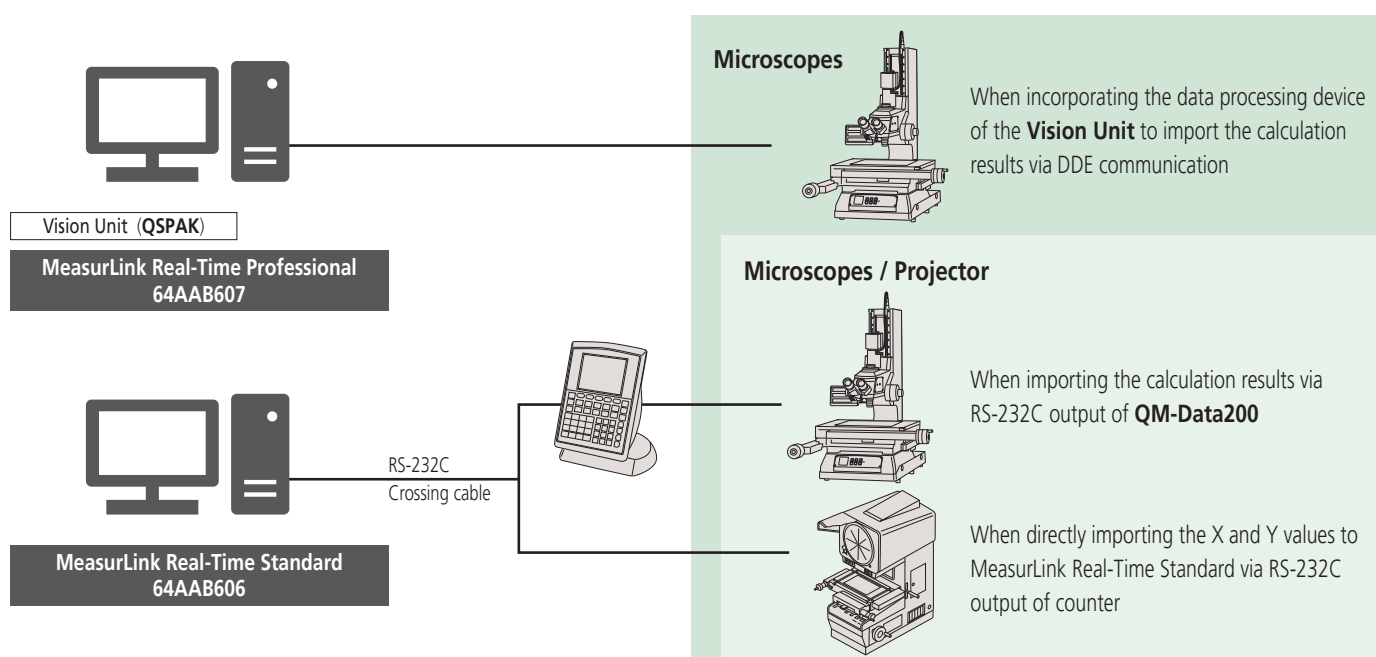
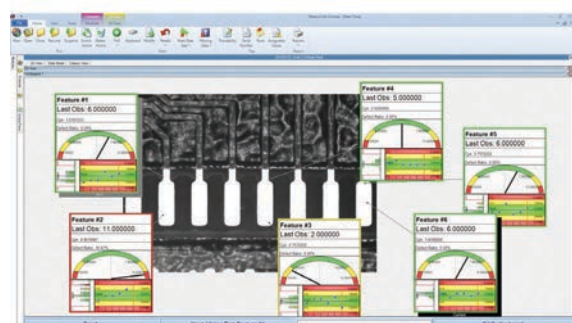# MeasurLink Real-Time Standard / Real-Time Professional

FEATURES

MeasurLink performs real-time statistical processing of measurement data from **QM-Data200** and the image unit and displays the process capability and X-bar R control chart. The statistical report and measurement data processed by **MeasurLink** can be easily output as Excel files.

MeasurLink allows the data integration and collective control of multiple measurement devices via expanded network system. If the administrative optional software is used together then the real-time data in production sites, such as quality control, production technology and design can be confirmed, making early detection of process irregularities possible.

Vision Unit（**QSPAK**）

MeasurLink Real-Time Professional
64AAB607

RS-232C
Crossing cable

MeasurLink Real-Time Standard
64AAB606

Microscopes

When incorporating the data processing device of the **Vision Unit** to import the calculation results via DDE communication

Microscopes / Projector

When importing the calculation results via RS-232C output of **QM-Data200**

When directly importing the X and Y values to MeasurLink Real-Time Standard via RS-232C output of counter

Just Importing Data to MeasurLink Allows Immediate Confirmation of Each Statistical Report!

Xbar-R control chart and histogram are displayed in real-time for each measurement item. A process manager can grasp time series data and data variations at a glance.

The work instruction image navigation window can be set by combining balloon displays of measurement items with workpiece image data (BMP, JPG, DXF, etc.). Extensive support functions are provided for beginners.

Parts data sheet (Evaluation of each workpiece)

OK/NG judgment results are displayed in red/yellow/green for easy understanding by operators. Combined with the alarm message function, this prevents NGs from being overlooked. The "Parts data sheet" lets you grasp the evaluation of each workpiece at a glance even when measuring many evaluation items by filtering the total judgment, NG data, and important items.

Attribute and Position Measurements

## Attribute inspection and data collection

In addition to variable measurement data collection, such as diameters, angles, and distances, Real-Time Standard and Real-Time Professional excel in attribute data collection and SPC, when defect counts and pass/fail visual inspections are required. Attribute charts available are C, NP, P, and U charts.

Turn visual inspections into meaningful data by calculating process capability and defect ratios.
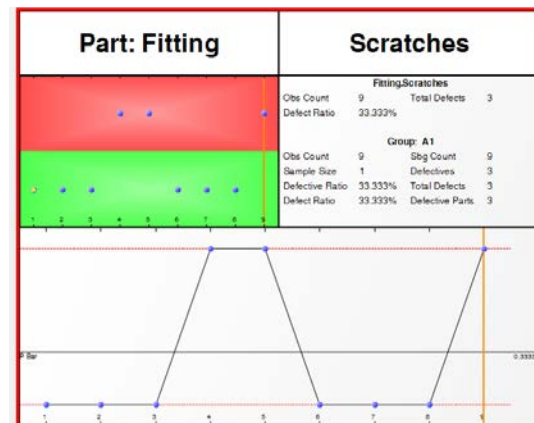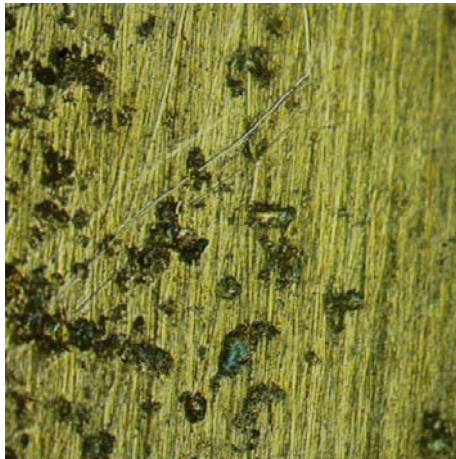
True Position with or without bonus tolerance

Visualize position data to target and tolerance with Real-Time position charts. The graphical representation of true position will aid inspectors in understanding how far off center and in what direction the 2D position is. Real-Time supports position tolerancing both regardless of feature size and with MMC or LMC.
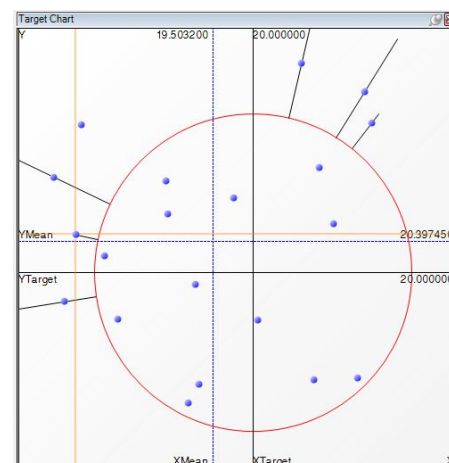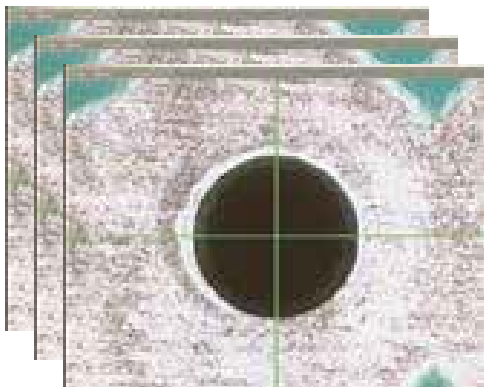

The Target Chart makes it easy to see data position. When the target chart has bonus and a data value is outside the tolerance region, the radial line shows the amount of available bonus.

Design custom report templates for fast and easy reporting

Save time by using custom report templates

Create report templates for any occasion: managerial report, customer report, audit report, etc. by simply dragging and dropping text elements, charts, and pictures.
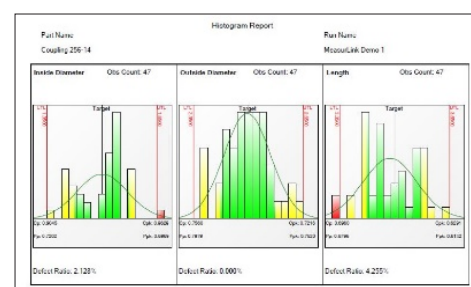
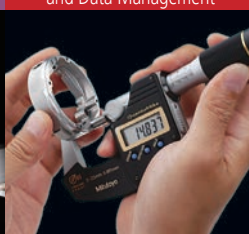| Coordinate Measuring Machines	Vision Measuring Systems	Form Measurement	Optical Measuring

Sensor Systems	Test Equipment and Seismometers	Digital Scale and DRO Systems	Small Tool Instruments and Data 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 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

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

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