Mitutoyo

Mitutoyo Quality

Optical Data-processing System
QM-Data200 and Vision Unit

Optical Measuring

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

Mitutoyo

Solutions to issues

Issue	Solution
Many errors in handwritten measurement data	Quality control based on data management system
Measurement variations depending on skill level	Easy operation for anyone reduces the variation
Labor shortage according to declining working population	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

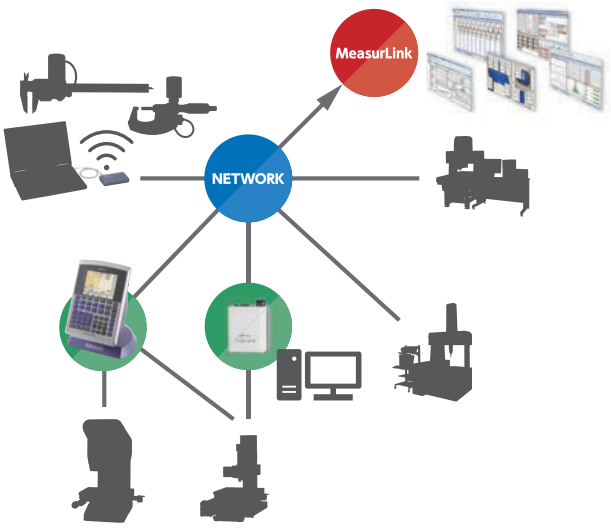
Collects data from Digimatic gages on the network and performs statistical process control (SPC) to warn of possible generation of defectives.

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



Mitutoyo

2D Data Processing Unit
QM-Data200

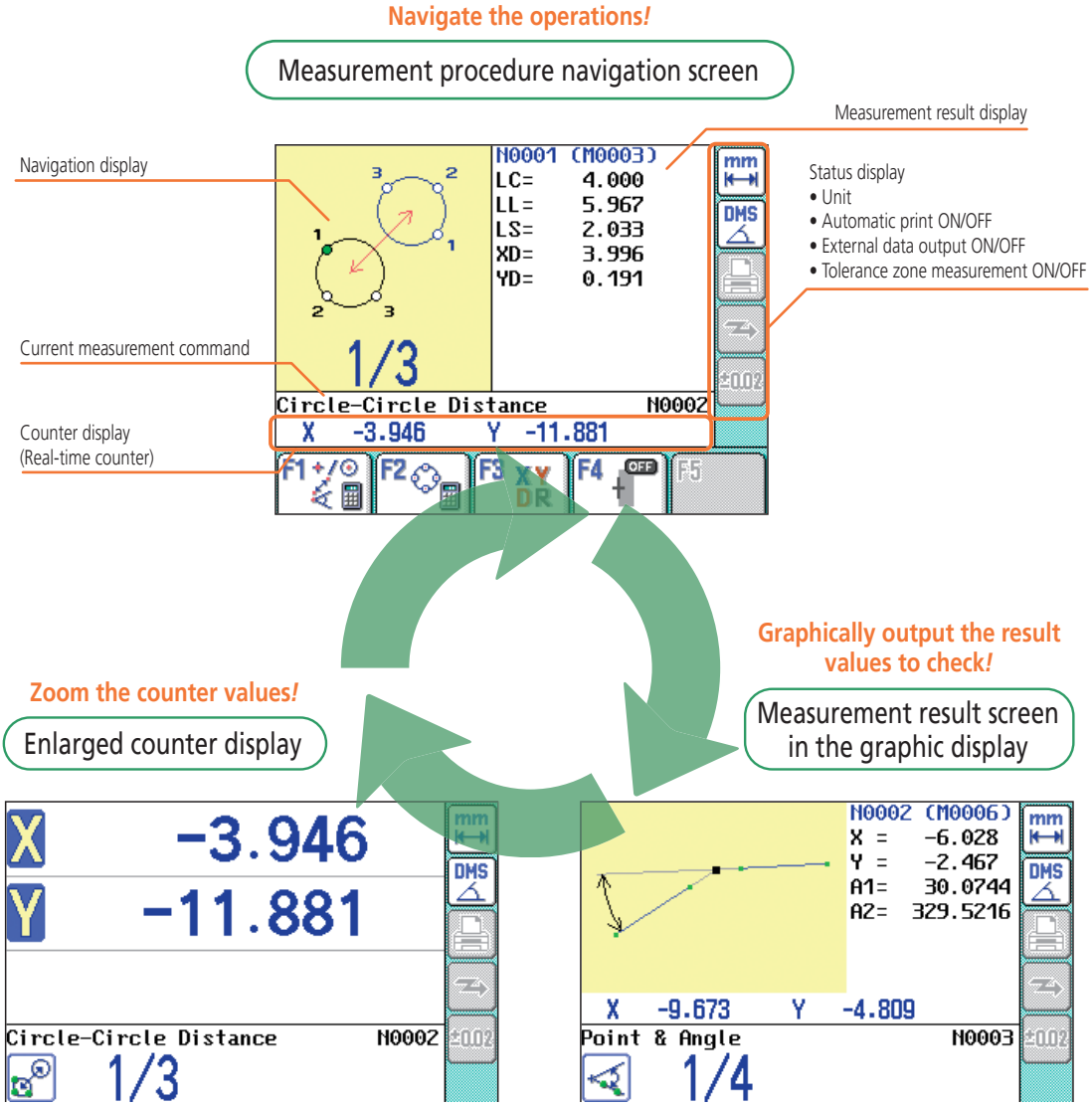
Data Processing Unit with Easy Operation

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

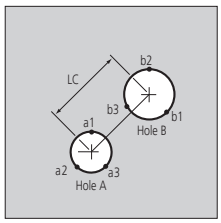
[Measurement procedure navigation screen], [Enlarged counter display], [Measurement result screen in the graphic display]. Selectable according to your purpose.

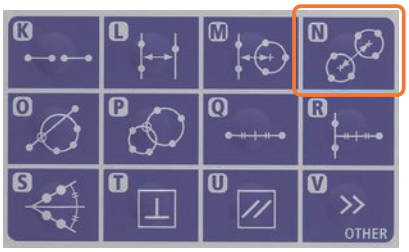


Experience measurement with the QM-Data200

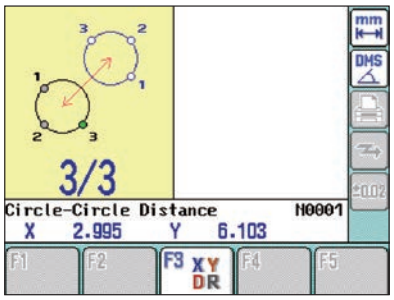
The comprehensive key panels of the **QM-Data200** make it easy for any operator to use. Simple operations help you concentrate on measurements.

Measurement example: Measure the distance between the centers of holes A and B.

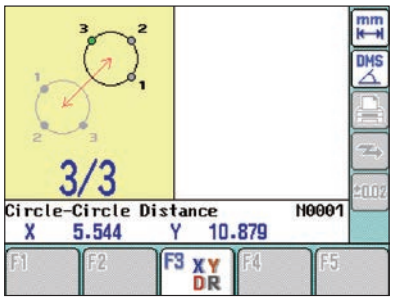




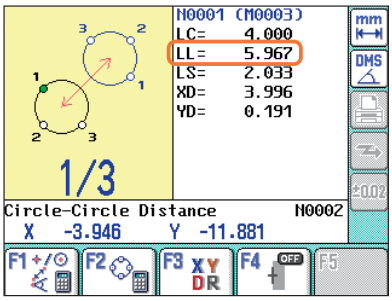
1. Select the "circle-circle distance" measurement key from the pattern-measurement keys.



2. Determine each position (a1, a2, a3) on round hole A, following the measurement navigation procedure on the LCD.



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).



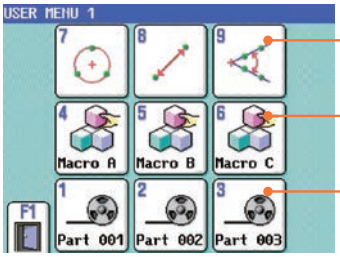
4. The measurement result is displayed.

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



* 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.

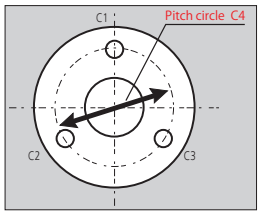
Mitutoyo

Efficiency

The coordinate entry format function (NP measurement)

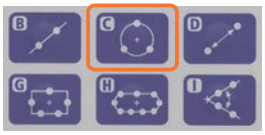
In a measurement using the coordinate entry format, the coordinates calculated from the measurement data (coordinates of the center of a circle, etc.) are applied to data entry as one measuring point. For example, measurement of the pitch of a rectangular hole can be executed simply by selecting the [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



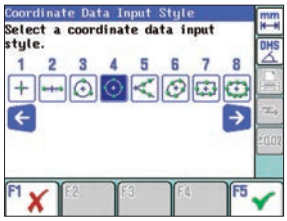
Types of coordinate entry formats

- **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.

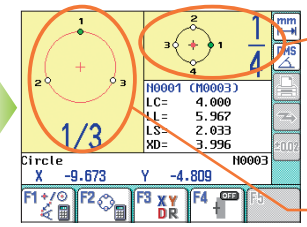


1. Press [CIRCLE MEASUREMENT] to measure pitch circle C4.

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

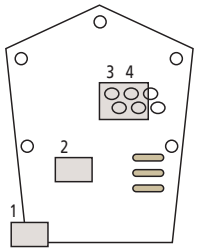
The diameter of the pitch circle (C4) can now be found.

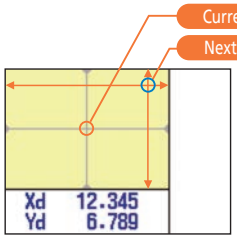
Measurement status of pitch circle display

Manual Operation Functions for Greater Measuring Efficiency

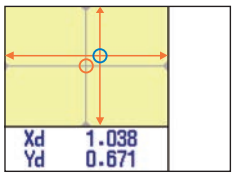
Navigation of measuring position

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.

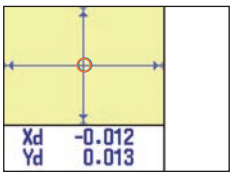




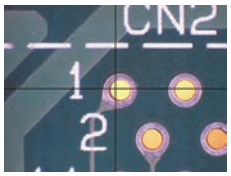
1. The next measuring point is indicated by the cross-hairs.



2. Move the measuring instrument stage to place one set of cross-hairs over the other (or to bring the counter reading to zero).



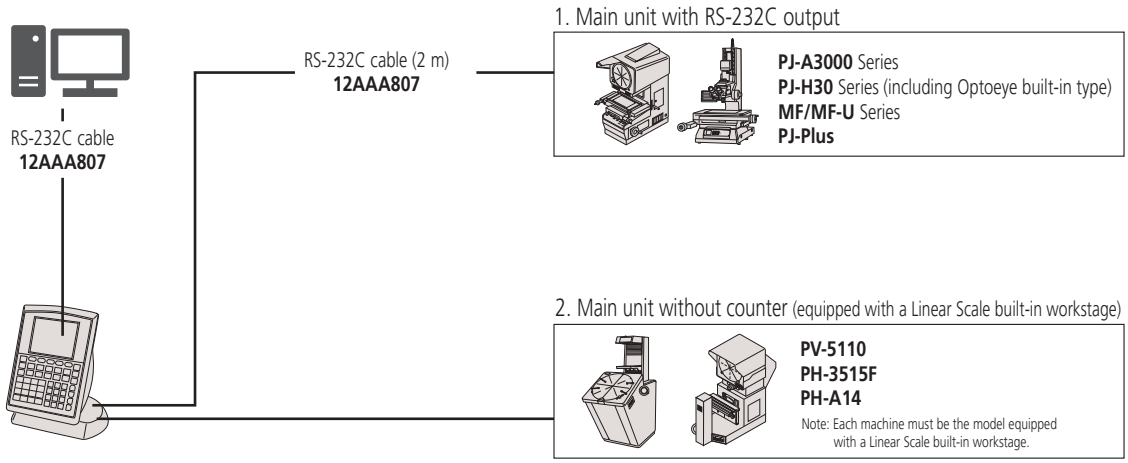
3. When the cross-hairs overlap, it is close to the next measuring point.



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

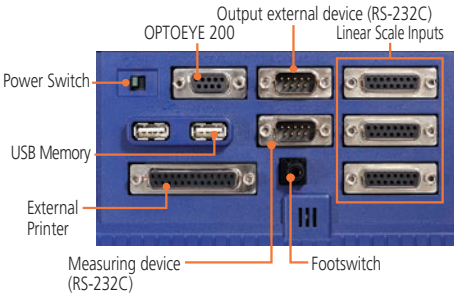


Specifications

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**

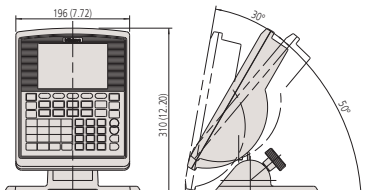
*1 To denote your AC line voltage add the following suffixes (e.g. 264-155A) A for 120 V, C for 110 V, D for 220 V, E for 240 V. No suffix is required for 100 V.
*2 Mitutoyo does not guarantee the operation of all commercial USB memories except for the following:
Mitutoyo recommends those USB memories 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

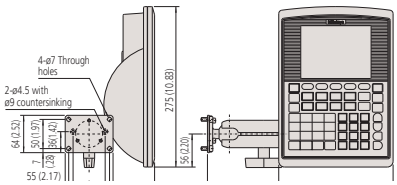


Dimensions

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

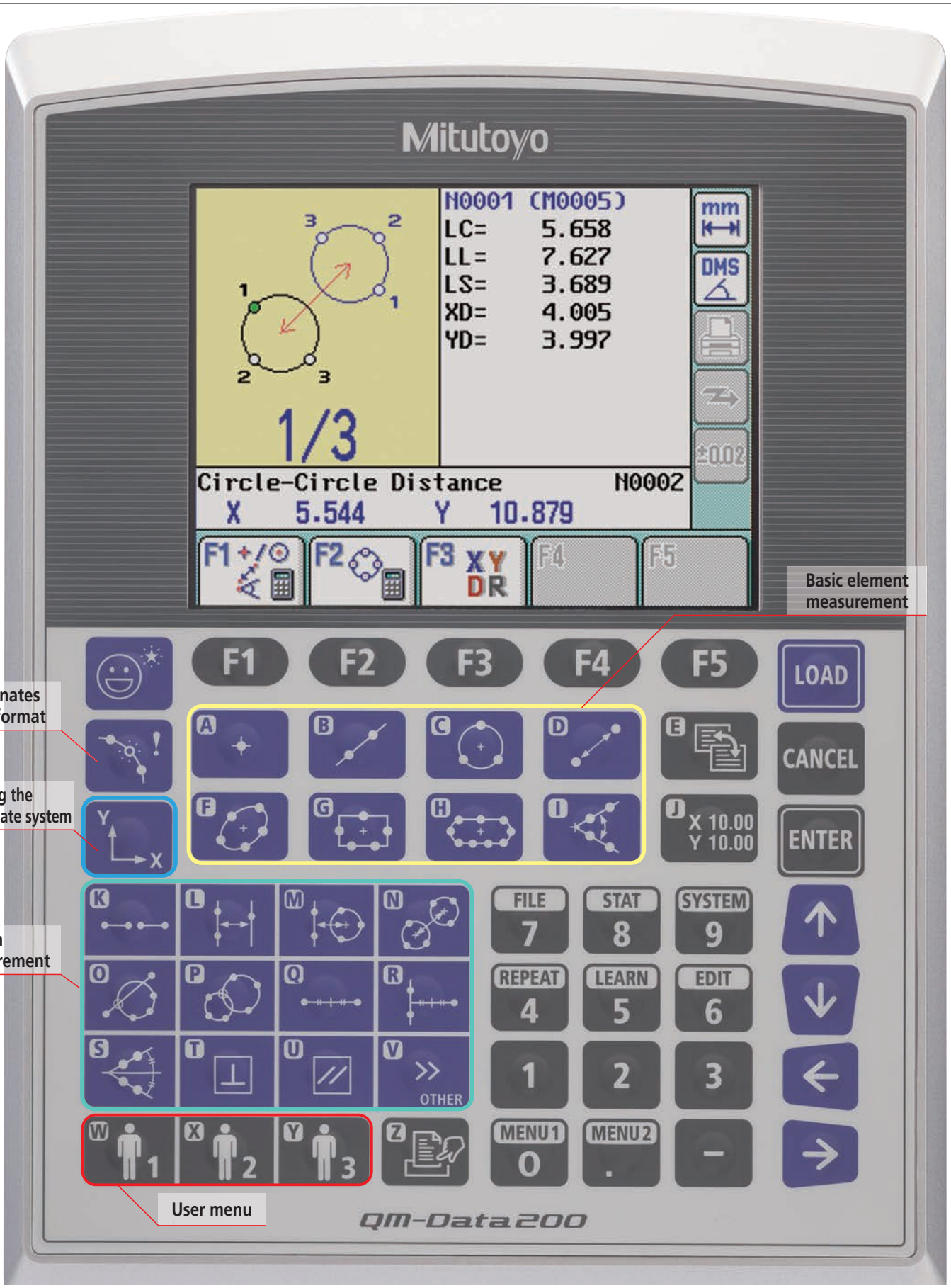


• Arm-mount type (Order No. **264-156A**)



Mitutoyo

Key panel



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.

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

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

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.

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.

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

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

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.)

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

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

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.

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

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

Point-point distance
Distance, Coordinates difference, radial difference

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)

Rectangular hole
Center coordinates, length, width

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

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-point distance
Perpendicular (shortest) distance

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

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

Line-circle intersection
Coordinates of intersection

Intersection of circles
Coordinates of intersection

Midpoint between points
Coordinates of midpoint

Midpoint between line and point
Coordinates of midpoint

Center line between line-circle
Angle with the X axis

Perpendicularity
Perpendicularity

Parallelism
Parallelism

Key menu

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

Midpoint between circles
Coordinates of midpoint

Projected point
Coordinates of the point projected on a line

Point-circle tangent point
Coordinates of tangent point

Circle-circle tangent line
Angle with the X axis

Corner
Diameter, radius of corner circle, center coordinates

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

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

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