No. 99MBA038A
SERIES No. 264

QM-Data 200

2D Data Processing Unit

User's Manual (Operation Guide)

Read this User's Manual thoroughly
before operating the instrument. After reading,
retain it close at hand for future reference.

Mitutoyo

CONVENTIONS USED IN THIS MANUAL

Types of Notes

The following types of notes are used in this manual to help the operator obtain reliable measurement data through correct instrument operation.

IMPORTANT

- An *important note* provides information essential to the completion of a task. You cannot disregard this note to complete the task.
- An *important note* is a type of precaution, which if neglected could result in a loss of data, decreased accuracy or instrument malfunction/failure.

NOTE A *note* emphasizes or supplements important points of the main text. It also supplies information about specific situations (e.g., memory limitations, equipment configurations, or details that apply to specific versions of a program).

TIP A *tip* is a type of note that helps the user apply the techniques and procedures described in the text to his or her specific needs.
It also provides reference information associated with the topic being discussed.

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Introduction

Thank you for using the “QM-Data 200” two-dimensional data processing unit.

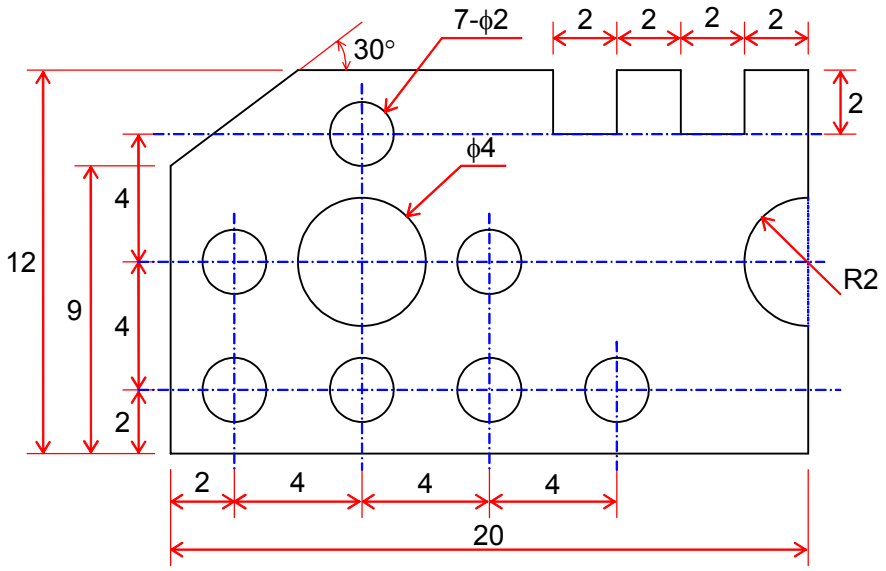
This Operation Guide presents a collection of example applications that will help you understand the basic operating procedures using the QM-Data 200.

Effective use of this Operation Guide will ensure that you use the QM-Data 200 correctly, and will help you in your measurement work.

Model Workpiece

The model workpiece shown below is used in all the examples presented.

This model workpiece is designed for practice purposes; dimensional precision is not guaranteed. Therefore, it should be noted that there may be some differences compared to the data in the examples presented.



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SERVICE NETWORK

MEMO

1 Before Starting Measurements

This chapter presents practice on the preparations which precede measurements using this data processing unit.

1.1 Outline of Data Processing Unit

1.1.1 Appearance

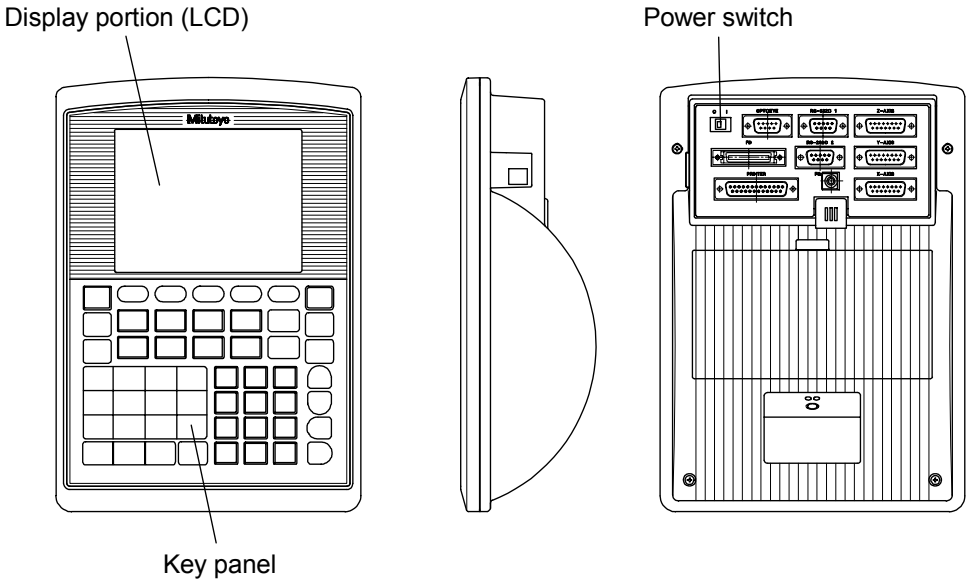


Fig. 1-1-1

1.1.2 Key Panel Layout

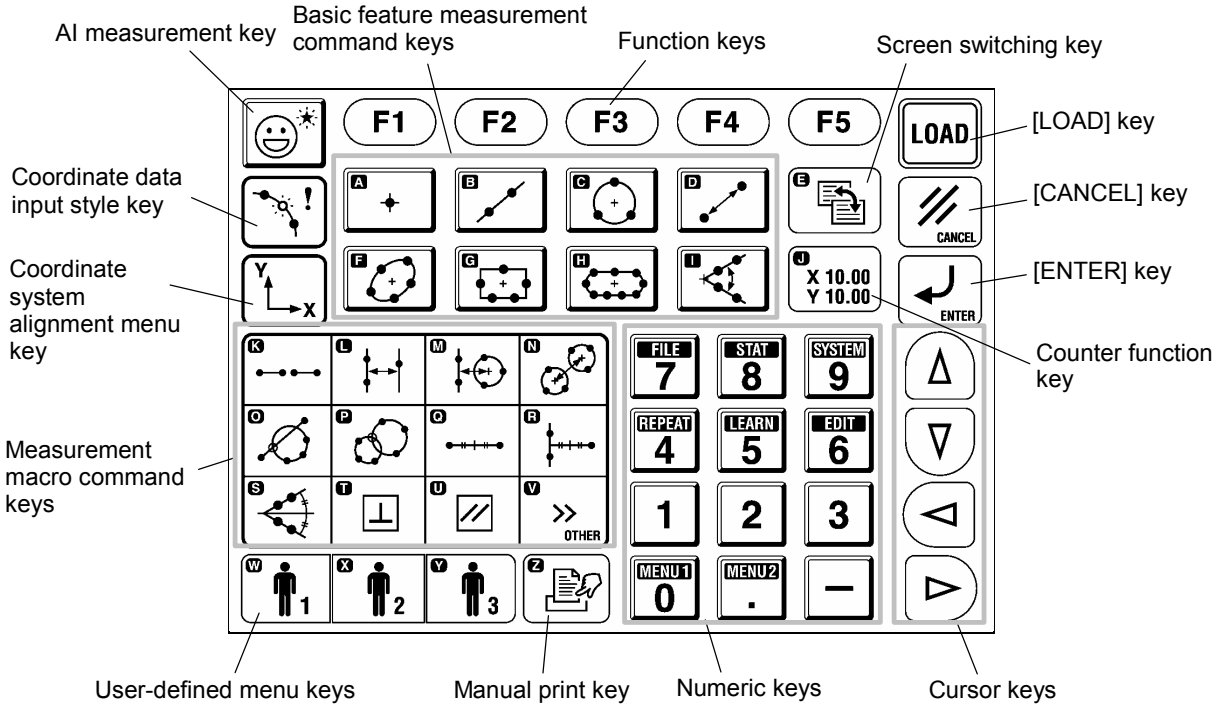


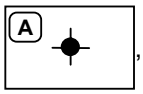
Fig. 1-1-2

Table 1-1-1 (No. 1)

Key	Function
Basic feature measurement command keys	Used to measure and calculate basic geometric shapes.
Measurement macro command keys	Used to measure and calculate width, pitch, perpendicularity, and other values that are not basic features.
Function keys	Used to select the icon for a function that can be used in a command which is being executed. The keys correspond to icons with function key numbers (F1, F2, ... F5).
[LOAD] key	Used to input a measured point.
[CANCEL] key	Cancels a measured point, or goes back to the immediately previous menu.
[ENTER] key	Enters the selection or entry, and goes to the next step.
Cursor keys	Used to move the cursor or select a parameter.
Numeric keys	Used to input numerical values, such as when entering a nominal value. These keys are also used to select menus shown on the LCD.
Coordinate system alignment menu key	Used to set or change the coordinate system.
Coordinate data input style key	Used to change the coordinate data input style.

Table 1-1-1 (No. 2)

Key	Function
AI measurement key	Automatically recognizes the type of the measured basic feature and outputs the results when measured points are input.
Screen switching key	Switches the screen display mode (measurement screen, counter display screen, etc.).
Counter function key	Uses the data processing unit as a simple counter.
Manual print key	Prints the measurement results displayed on the screen.
User-defined menu keys	Executes a previously registered part program or user-defined macro command.

TIP Keys with a letter of the alphabet in their upper left corner, such as  , are used to enter an alphabetic text, such as a file name and a comment.

1.1.3 Elements of LCD Screen

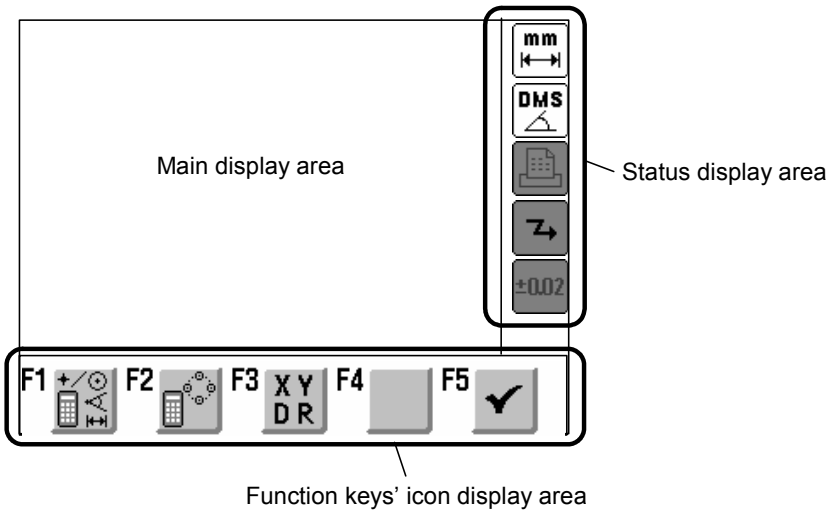


Fig. 1-1-3

[Main display area]

Displays counter values, measurement results, operation guidance, etc.

[Status display area]

Displays information on the currently set functions.

[Function keys' icon display area]

Displays icons for the functions that can be used with a command which is being executed.

1.1.4 Measurement Screen

<Measurement standby screen (example of circle measurement)>

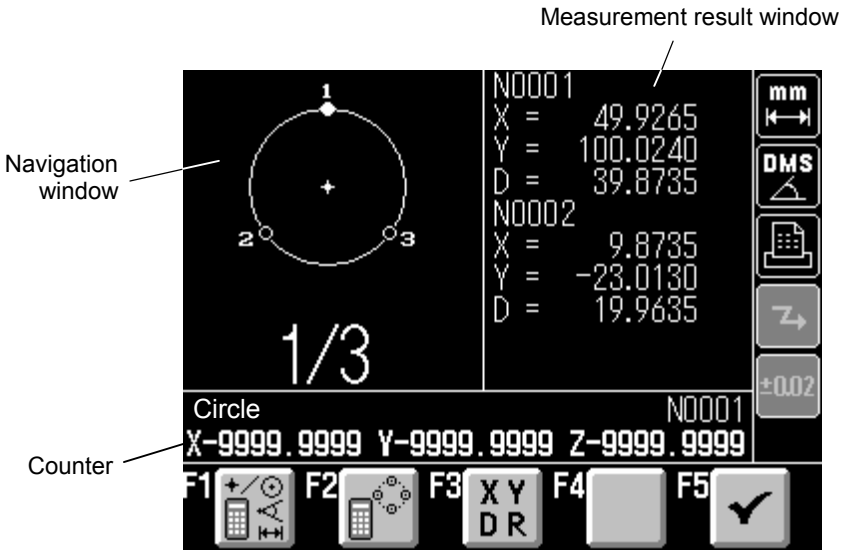


Fig. 1-1-4

F1: Recalls the measured features and performs calculations, etc.

F2: Recalls the measured features to adopt the representative point coordinates of those features as measured points for the current measurement.

F3: Changes the measurement conditions ("Output Items", "Auto.MeasuringCompletion").

F4: (Enables/disables input of measured points based on edge detection if OPTOEYE is mounted.)

F5: Completes the input operation of measurement points and outputs results at the multi-point measurement.

In the navigation window, the next location to be measured flashes to navigate the next measuring position. The flashing location moves as shown below, each time a point is entered.

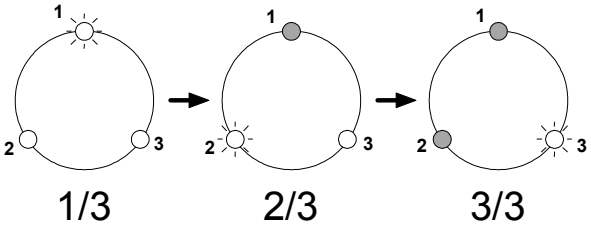


Fig. 1-1-5

TIP • When the results are displayed at the end of the measurement, the navigation window returns to its initial input standby state (“1/3” in the above figure), and the same measurement is repeated automatically.

• To perform a different measurement, press a different measurement command key.

1.2 Preparing for Measurement

[Purpose of Practice]

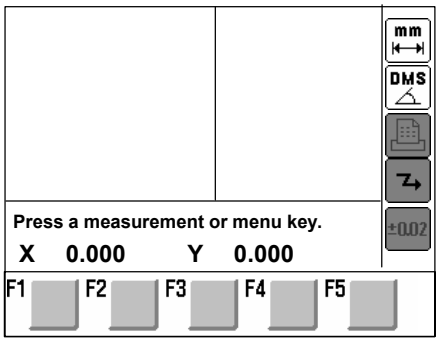
To learn the operating procedures from turning on the power to getting the state where measurement commands can be executed.

[Operating Procedure]

1) Turn on the power for the data processing unit.
2) Set the printer output to ON.

1.2.1 Turning On the Power

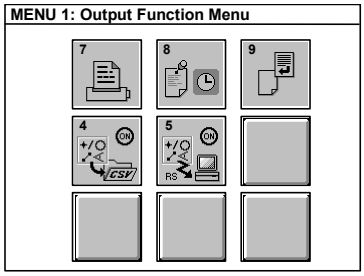
Table 1-2-1

No.	Operation	Screen display and remarks
1	Turn the power switch to ON.	–
2	**The Startup Screen is displayed.** A little bit after the opening screen is displayed, the startup screen shown at right is displayed.	

1.2.2 Setting Printer Output to ON (when printer is connected)

NOTE Be sure to turn on the printer power before setting the printer output to ON.

Table 1-2-2

No.	Operation	Screen display and remarks
1	**Selecting menu function** Press MENU 1 0.	
2	**Selecting printer setting** Press the numeric key corresponding to .	–
3	**Selecting ON for printer** Use the left and right cursor keys to select “All Results w/o Command Names” for “Contents to Be Printed”.	–
4	**Finishing printer setting** Press the [F5] function key corresponding to .	**<Remarks>** Measurement results subsequent to this setting are printed by the printer.

TIP To cancel printer output, select “None” in step 3 above.

2 Basic Measurements

This chapter presents practice for basic measurement procedures using the model workpiece.

2.1 Measuring a Circle

[Purpose of Practice]

To measure a circle using the model workpiece.

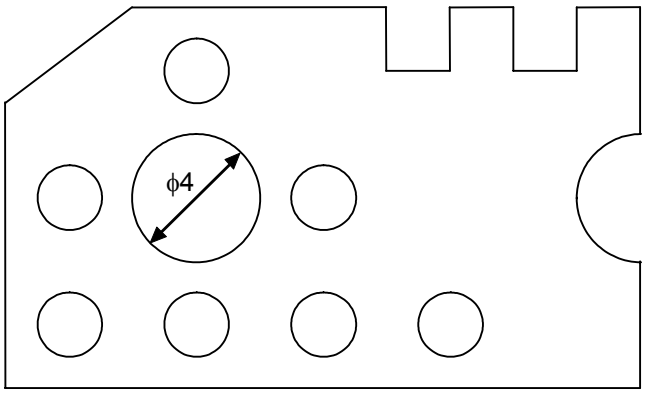
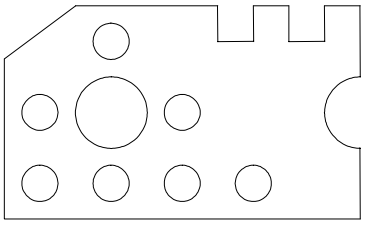
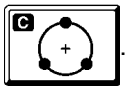
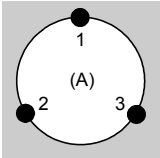
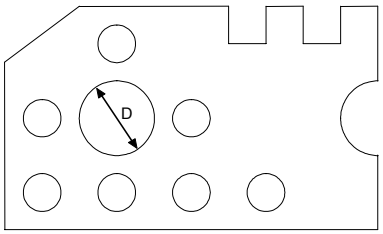
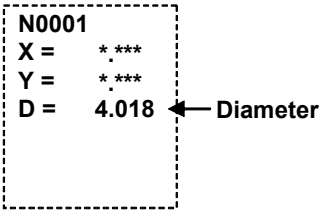


Fig. 2-1-1

[Operating Procedure]

Table 2-1-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Measurement function selection** Press  .	–

No.	Operation	Screen display and remarks
3	**Measuring circle (A)** At any three points on the circumference of circle (A), center the projection screen crosshairs and then press the [LOAD] key. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
4	**Results display** The circle (A) measurement results are displayed on the screen. 	

NOTE
- The three points that are measured should be spaced as far apart from each other as possible on the circumference in order to measure the circle precisely.
- The X and Y coordinate results indicating the circle's center position vary depending on the position and orientation of the model workpiece on the XY table. In order to obtain measurement results that match the dimensions shown in the section titled "Model Workpiece", before starting the measurement, perform the operation described in Section 3.2 "Aligning Part Coordinate System Using Edges as Reference".

TIP
- If an incorrect position was measured, it is possible to cancel the measured point data by pressing the [CANCEL] key prior to entering the last measurement point. If the [CANCEL] key is held down, the system returns to the standby state for the first measurement point.
- The last measurement point cannot be canceled. If the last measurement point is not correct, redo the measurement.

2.2 Measuring Angle Between Two Edges

[Purpose of Practice]

To measure the angle between two edges using the model workpiece.

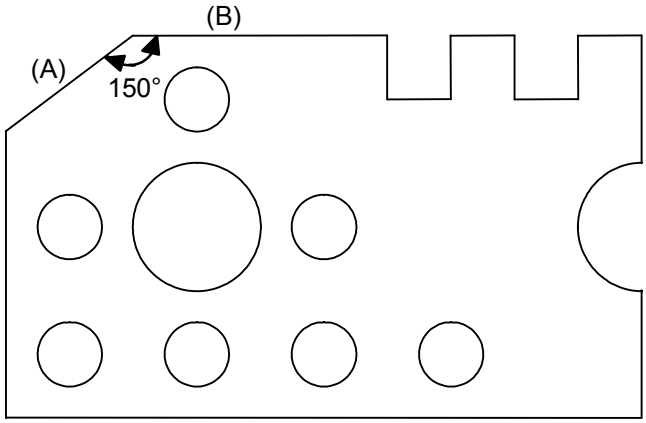
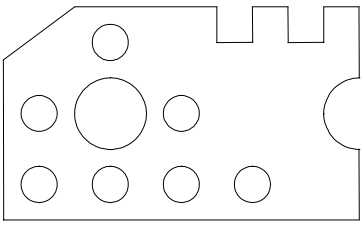
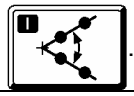
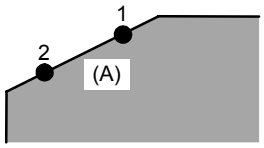
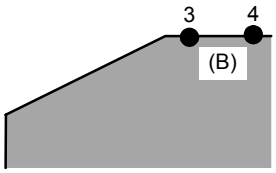
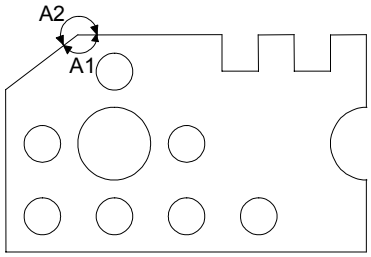


Fig. 2-2-1

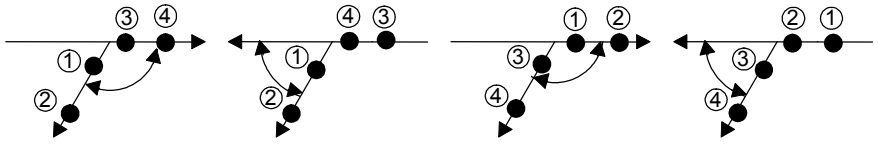
[Operating Procedure]

Table 2-2-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Measurement function selection** Press  .	–
3	**Measuring edge (A)** Measure edge (A) at two points. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.

No.	Operation	Screen display and remarks
4	**Measuring edge (B)** Measure edge (B) at two points. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
5	**Results display** The measurement results (A1, A2) for the angle formed by edge (A) and edge (B) are displayed on the screen. 	**N0001** **X = *.*** **Y = *.*** **A1= 150.0142** **A2= 209.5818**

NOTE • Note that the obtained angle (A1) varies depending on the order in which the edges are measured, as shown below.



- The X and Y coordinate results of the intersection point vary depending on the position and orientation of the model workpiece on the XY table. In order to obtain measurement results that match the dimensions shown in the section titled “Model Workpiece”, before starting the measurement, perform the operation described in Section 3.2 “Aligning Part Coordinate System Using Edges as Reference”.
- Angle units can be switched between degrees (decimal notation) and degrees, minutes and seconds (sexagesimal notation). See Chapter 6 of the “Software Guide” for the switching procedure.

2.3 Measuring a Width

[Purpose of Practice]

To measure a width using the model workpiece.

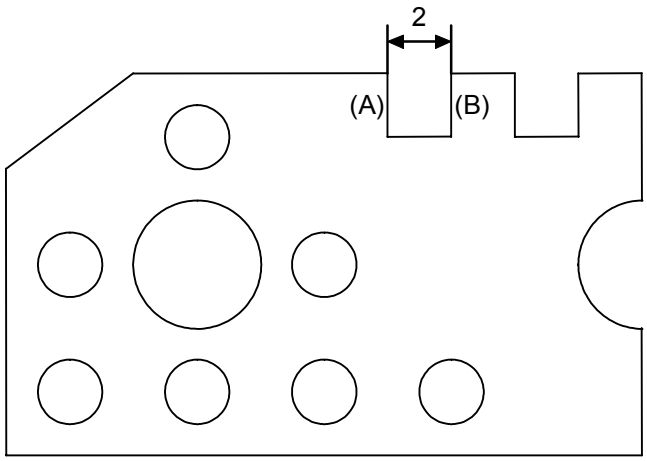
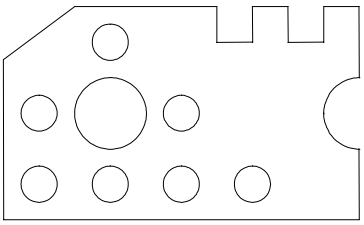
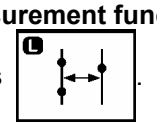
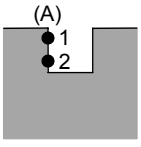
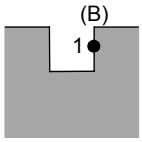
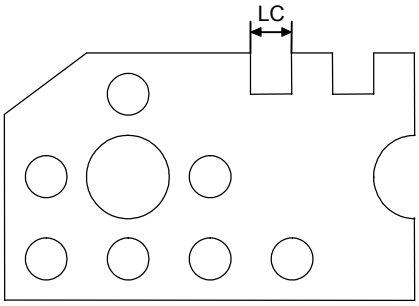


Fig. 2-3-1

[Operating Procedure]

Table 2-3-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Measurement function selection** Press  .	–
3	**Measuring side (A)** Measure side (A) at two points. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.

No.	Operation	Screen display and remarks
4	**Measuring side (B)** Measure side (B) at one point. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
5	The width measurement result (LC) is displayed on the screen. 	**N0001** **LC= 2.001**

NOTE When measuring a width, be sure to enter two points for the edge being measured first, and then enter one remaining point for the edge being measured second.

TIP
- If an incorrect position was measured, it is possible to cancel the measured point data by pressing the [CANCEL] key prior to entering the last measurement point. If the [CANCEL] key is held down, the system returns to the standby state for the first measurement point.
- The last measurement point cannot be canceled. If the last measurement point is not correct, redo the measurement.

2.4 Measuring Distance Between Two Circles

[Purpose of Practice]

To measure two circles to obtain the distance between them.

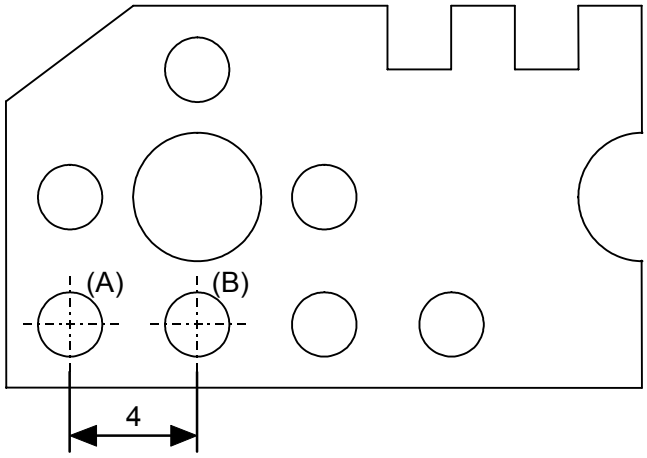
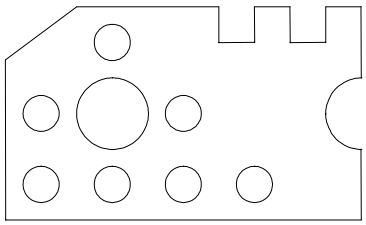
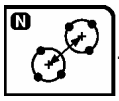
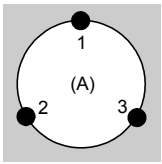
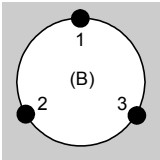
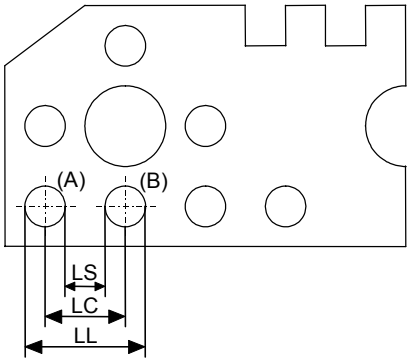


Fig. 2-4-1

[Operating Procedure]

Table 2-4-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Measurement function selection** Press  .	–
3	**Measuring circle (A)** Measure circle (A) at three points. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.

No.	Operation	Screen display and remarks
4	**Measuring circle (B)** Measure circle (B) at three points.  	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
5	**Results display** The measurement results (LC, LS, LL) for the distance between circle (A) and circle (B) are displayed on the screen.  	**N0001** **LC= 4.006** **LL= 6.011** **LS= 2.001** **XD= *.*** **YD= *.***

TIP • The XD and YD measurement results indicating the distance between the two circles along the X and Y axes vary depending on the position and orientation of the model workpiece on the XY table. In order to obtain measurement results that match the dimensions shown in the section titled “Model Workpiece”, before starting the measurement, perform the operation described in Section 3.2 “Aligning Part Coordinate System Using Edges as Reference”.

3 Aligning Part Coordinate System

This chapter presents practice on the procedures for aligning the part coordinate system using the model workpiece.

3.1 Aligning Part Coordinate System

When the data processing unit is turned on, the coordinate values in the coordinate system matching the moving directions of the XY table are output as measurement results. (See Fig. 3-1-1.)

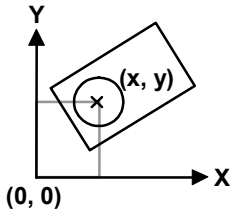


Fig. 3-1-1

Therefore, in order to correctly evaluate information such as the center coordinates of a circle on a workpiece as dimensions, the coordinate system must be aligned to match the workpiece's position and orientation.

The aligned coordinate system is called the part coordinate system (PCS). (See Fig. 3-1-2.)

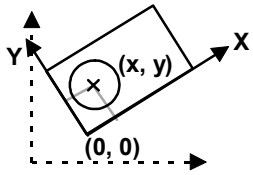


Fig. 3-1-2

Once the part coordinate system is set, it is possible to obtain precise measurements and calculations even if the workpiece's orientation is not adjusted to be parallel with the moving directions of the XY table.

3.2 Aligning Part Coordinate System Using Edges as Reference

[Purpose of Practice]

To align the part coordinate system based on two edges that are perpendicular to each other, using the model workpiece.

[Description of Operation]

The part coordinate system is set using the coordinate system alignment macro command (1).

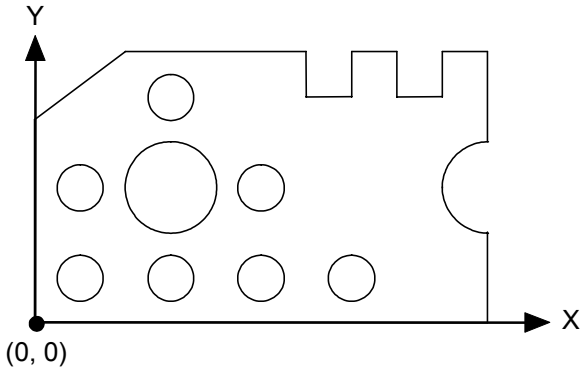
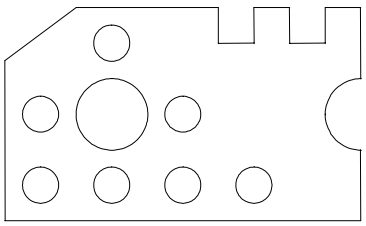
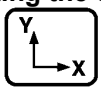
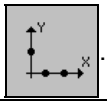
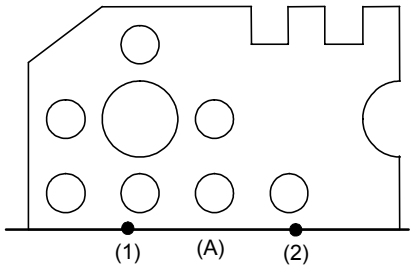
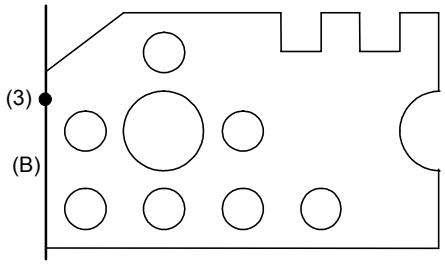
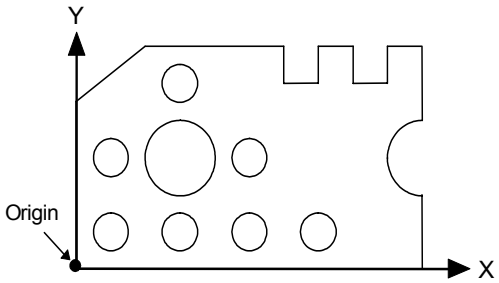


Fig. 3-2-1

[Operating Procedure]

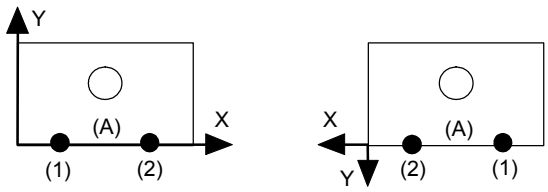
Table 3-2-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Selecting the coordinate system alignment menu** Press  . The coordinate system alignment function menu is displayed.	–
3	**Selecting the coordinate system alignment macro command (1)** Press the numeric key corresponding to  .	–

No.	Operation	Screen display and remarks
4	**Measuring edge (A)** Measure edge (A) at two points.  	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
5	**Measuring edge (B)** Measure edge (B) at one point.  	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
6	**The part coordinate system is completed.** The part coordinate system is completed as shown below.  	**<Remarks>** Once the part coordinate system is completed, coordinate values are defined from the origin, which serves as a reference. The part coordinate system established in this example matches the coordinate system shown in the section titled “Model Workpiece”. Therefore, you can refer to the drawing in that section while practicing measurements.

TIP See Chapter 5 of the “Software Guide” for further details about the coordinate system alignment functions.

NOTE When measuring edge (A), note the order in which the measurements are performed, as the direction of the coordinate system’s reference axis varies depending on the measurement order.



The X-axis direction orients from the first measured point to the second measured point.

3.3 Aligning Part Coordinate System Using Circle Centers as Reference

[Purpose of Practice]

To align the part coordinate system based on two circle centers, using the model workpiece.

[Description of Operation]

The part coordinate system is set using the coordinate system alignment macro command (4).

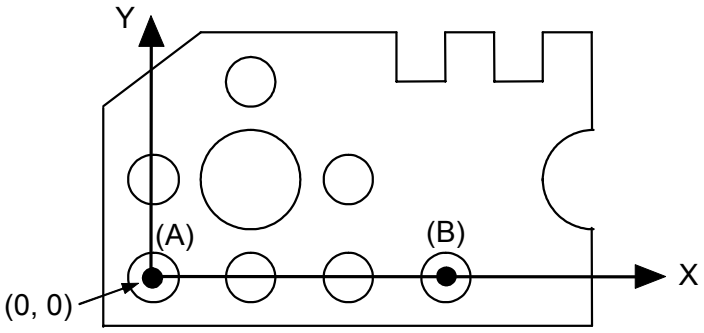
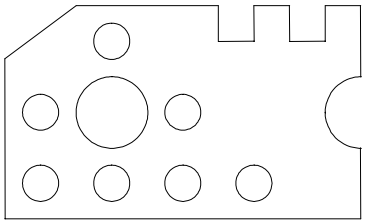
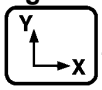
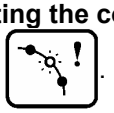
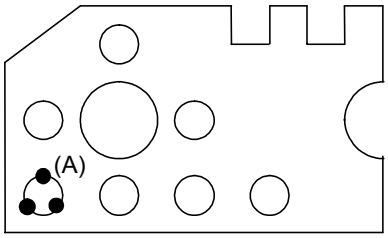
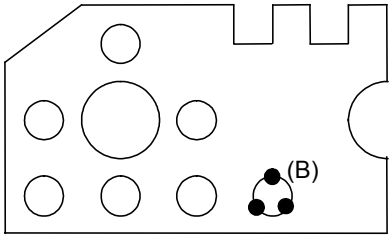
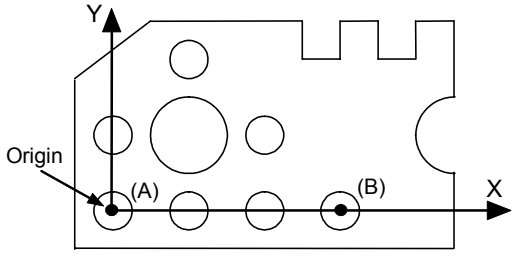


Fig. 3-3-1

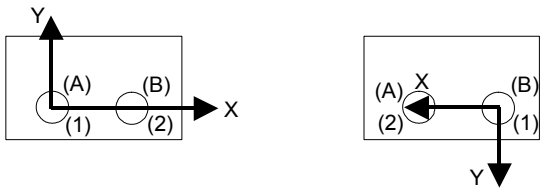
[Operating Procedure]

Table 3-3-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Selecting the coordinate system alignment menu** Press  . The coordinate system alignment function menu is displayed.	–
3	**Selecting the coordinate system alignment macro command (4)** Press the numeric key corresponding to .	–

No.	Operation	Screen display and remarks
4	**Selecting the coordinate data input style** Press  . Then, from the icon menu, press the numeric key corresponding to .	–
5	**Measuring circle (A)** Measure circle (A) at three points. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
6	**Measuring circle (B)** Measure circle (B) at three points. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
7	**The part coordinate system is completed.** The part coordinate system is completed as shown below. 	**<Remarks>** Once the part coordinate system is completed, coordinate values are defined from the origin, which serves as a reference.

NOTE When measuring circle (A) and circle (B), note the order in which the measurements are performed, as the direction of the coordinate system's reference axis varies depending on the measurement order.



The X-axis direction orients from the center of the first measured circle to the center of the second measured circle.

TIP After this measurement example, the coordinate data input style remains "Circle center input".
Use the following procedure to reset the coordinate data input style to "Actual point input".

Table 3-3-2

No.	Operation	Screen display and remarks
1	**Selecting the coordinate data input style** Press . Then, from the icon menu, press the numeric key corresponding to .	–

TIP
- See Chapter 5 of the "Software Guide" for further details about the coordinate system alignment functions.
- See Chapter 4 of the "Software Guide" for further details about the coordinate data input style.

4 Applied Measurements

This chapter presents practice on applied measurement procedures using the model workpiece.

4.1 Multi-point Measurement

[Purpose of Practice]

To practice taking measurements using multiple points. In this section, a line is measured at three or more points to determine the angle formed by the line and the X-axis, and the straightness of the line.

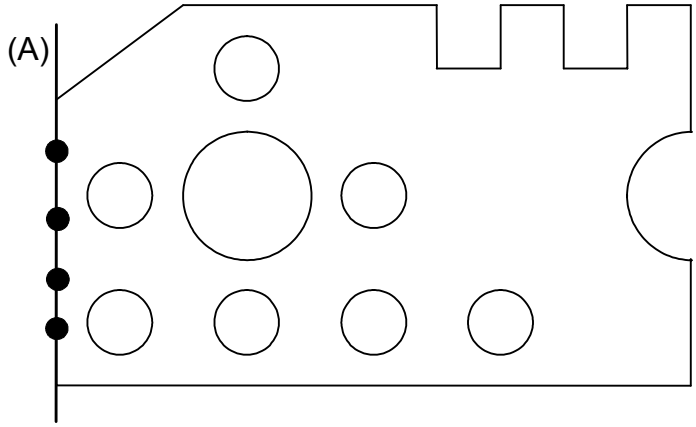
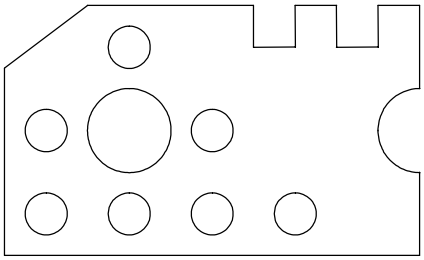
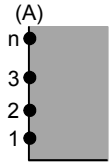
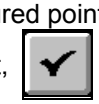
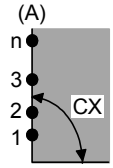


Fig. 4-1-1

[Operating Procedures]

Table 4-1-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Aligning the part coordinate system** For the aligning procedure, see Section 3.2 “Aligning Part Coordinate System Using Edges as Reference”.	The explanation for the operations from step 3 onward assumes that the part coordinate system has been aligned.
3	**Measurement function selection** Press .	–
4	**Changing measurement conditions** Press the [F3] function key corresponding to .	–
5	**Setting “Auto.MeasuringCompletion” to OFF** Press the [F3] key to set the “Auto.MeasuringCompletion” to “OFF”.	Auto.MeasuringCompletion: OFF : Press [F3] to switch the status.
6	**Completion of changing measurement conditions** Press the [F5] function key corresponding to .	–
7	**Measuring edge (A)** Measure edge (A) at three or more points. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.

No.	Operation	Screen display and remarks
8	**Completing the measurement** When two or more measured points required for measuring a line are input,  is displayed. Press the corresponding [F5] function key to complete the measurement.	–
9	**Results display** The measurement results for edge (A) are displayed on the screen. 	**N0001** **CX = 90.0215** **F1 = 0.154**

TIP
- To perform measurements in such a manner that a multi-point measurement is automatically completed when the predetermined number of measuring points have been input, reset “Auto.MeasuringCompletion” to “ON” (see steps 4 through 6).
- The multi-point measurement can be performed using the same procedure on points, circles, and ellipses in addition to lines.

4.2 Selecting and Outputting Required Measurement Items Only

[Purpose of Practice]

To practice selecting and outputting just the required items as measurement results. In this section, the point & angle feature formed by two adjacent edges is measured to output only the intersection angle (A1).

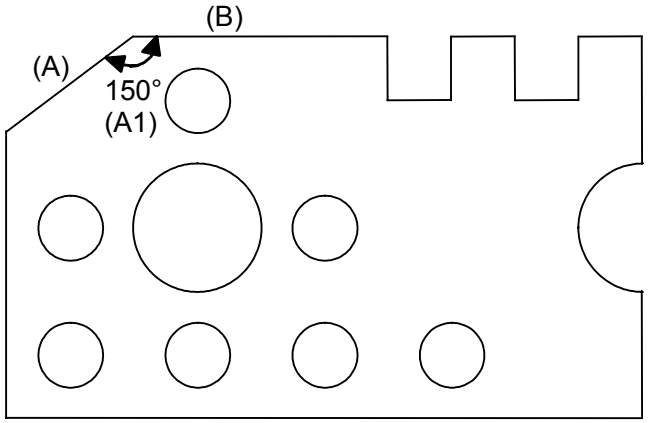
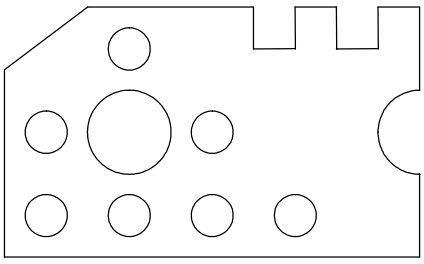
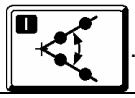
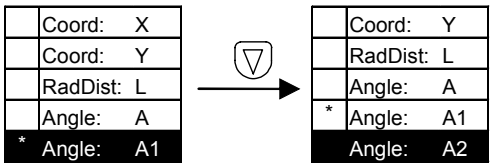
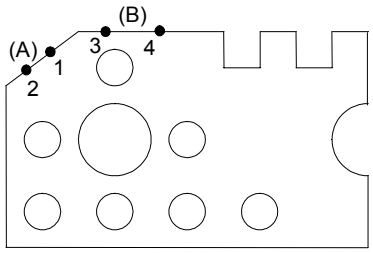
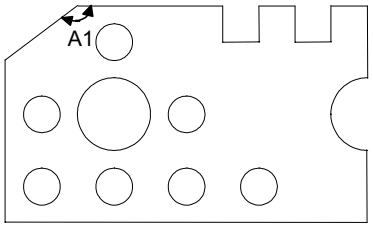


Fig. 4-2-1

[Operating Procedures]

Table 4-2-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Measurement function selection** Press  .	–
3	**Starting output item selection** Press the [F3] function key corresponding to .	–

No.	Operation	Screen display and remarks
4	**Selecting output item** Use the up and down cursor keys ▲ ▼ to highlight the item to be selected. Each time the [ENTER] key is pressed, an asterisk (*) appears to the left of the highlighted item, or is removed from the item. In this example, place an asterisk (*) next to “Angle: A1” only.	 **<Remarks>** In some cases, it may not be possible to display all of the output items at once. In such cases, scroll through the screen to view the hidden items using the up and down cursor keys ▲ ▼.
5	**Completing output item selection** Press the [F5] function key corresponding to ✔.	**<Remarks>** Only the output items with an asterisk (*) next to them will be output after the measurement.
6	**Measuring edges (A) and (B)** Measure edges (A) and (B). 	**<Remarks>** Follow the information displayed on the screen to perform the measurement. The procedure is the same as steps 3 to 4 in Section 2.2 “Measuring Angle Between Two Edges”.
7	**Result display** Only the measurement result for the intersection angle (A1) between edge (A) and edge (B) is displayed on the screen. 	**N0001** **A1 = 150.1826**

TIP The output item selection result made in the above example remains in effect until the power is turned off.

4.3 Recalling Measured Features to Construct a New Feature

[Purpose of Practice]

This section presents practice on recalling measured features to calculate a new feature.

In this section, the measurement results for two circles (A) and (B) are recalled to calculate the midpoint between them.

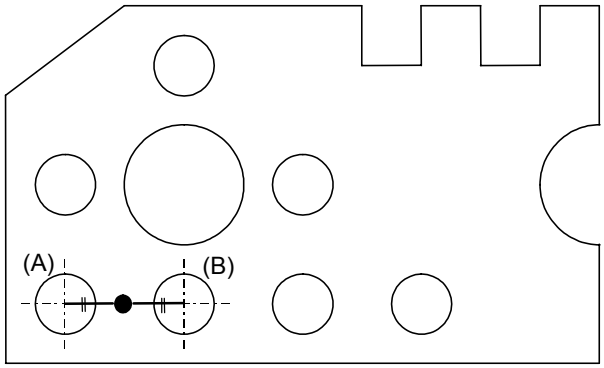
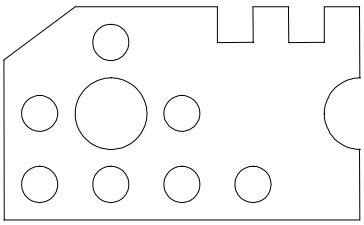
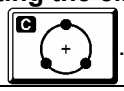
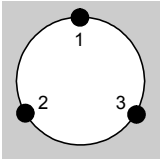
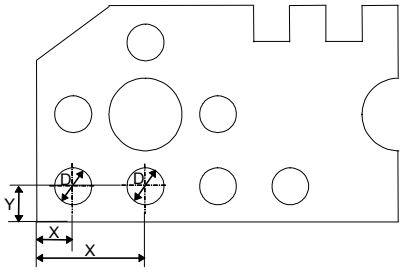
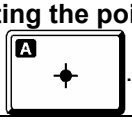
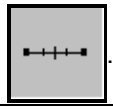


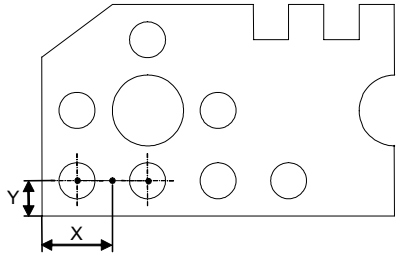
Fig. 4-3-1

[Operating Procedures]

Table 4-3-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Aligning the part coordinate system** For the aligning procedure, see Section 3.2 “Aligning Part Coordinate System Using Edges as Reference”.	The explanation for the operations from step 3 onward assumes that the part coordinate system has been aligned.
3	**Selecting the circle feature measurement command** Press  .	–

No.	Operation	Screen display and remarks
4	**Measuring circles (A) and (B)** Measure circles (A) and (B) using the same procedure as in step 3 of Section 2.1 “Measuring a Circle”. 	**<Remarks>** Follow the information displayed on the screen to perform the measurement.
5	**Results display** The measurement results for circles (A) and (B) are displayed on the screen. 	N0001 X = 2.055 Y = 2.008 D = ••••• N0002 X = 6.013 Y = 2.010 D = •••••
6	**Selecting the point feature measurement command** Press  .	–
7	**Displaying the feature construction menu** Press the [F1] function key corresponding to .	–
8	**Selecting the midpoint construction** Press the numeric key corresponding to  .	–
9	**Selecting the measured features** Use the up and down cursor keys to highlight the measurement result for circle (A) and then press the [ENTER] key. Then perform the same operation for the measured circle (B).	: : X = •••• : : Y = •••• : : D = •••• : : *10 ○ *11 ○

No.	Operation	Screen display and remarks
10	**Result display** The coordinates of the midpoint between circle (A) and circle (B) are displayed on the screen.  	**N0003** **X = 4.034** **Y = 2.009**

4.4 Performing Tolerance Judgment

[Purpose of Practice]

To compare measurement results with nominal values and tolerance zones, and to make a GO/NG judgment.

In this section, circle (A) is measured and the tolerance judgment is performed.

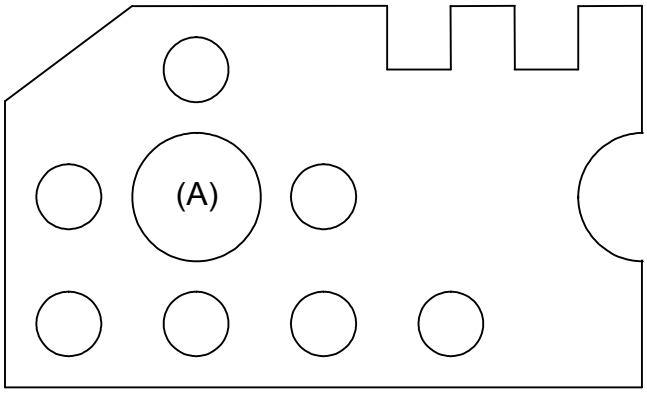
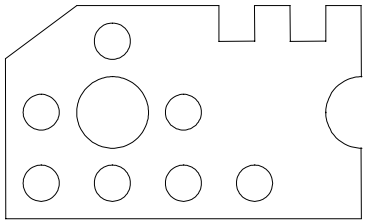
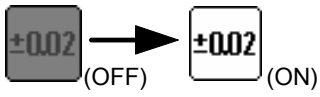
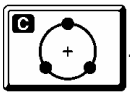
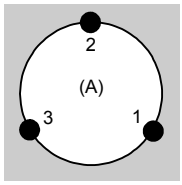
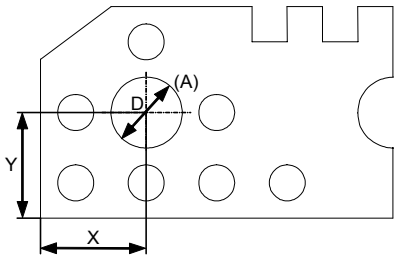


Fig. 4-4-1

[Operating Procedures]

Table 4-4-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Aligning the part coordinate system** For the aligning procedure, see Section 3.2 “Aligning Part Coordinate System Using Edges as Reference”.	The explanation for the operations from step 3 onward assumes that the part coordinate system has been aligned.
3	**Selecting Menu 2** Press .	–

<table>
<tr><th>No.</th><th>Operation</th><th>Screen display and remarks</th></tr>
<tr><td>4</td><td>Selecting the command for setting the tolerance judgment function to ON or OFF
Press the numeric key corresponding to .</td><td>–</td></tr>
<tr><td>5</td><td>Setting the tolerance judgment function to ON
Confirm that “Tolerance Judgment” is set to “ON”, and then press the [F5] function key corresponding to .</td><td><Remarks>
The status display changes as follows.
 
(OFF) (ON)</td></tr>
<tr><td>6</td><td>Measurement function selection
Press  .</td><td>–</td></tr>
<tr><td>7</td><td>Measuring circle (A)
Measure circle (A) at three points.
  </td><td><Remarks>
Follow the information displayed on the screen to perform the measurement.</td></tr>
<tr><td>8</td><td>Inputting tolerance data
Move the cursor to the input columns and enter the nominal values and tolerance values using the numeric keys. Note that items with no input data are not judged.</td><td><table><tr><th colspan="2">Output Item</th><th>Nominal</th><th>U. Tol.</th><th>L. Tol.</th></tr><tr><td>Coord:</td><td>X</td><td>6.000</td><td>0.010</td><td>-0.010</td></tr><tr><td>Coord:</td><td>Y</td><td>6.000</td><td>0.010</td><td>-0.010</td></tr><tr><td>Dia:</td><td>D</td><td>4.000</td><td>0.010</td><td>-0.010</td></tr></table></td></tr>
<tr><td>9</td><td>Completion of inputting the tolerance data
Press the [F5] function key corresponding to .</td><td>–</td></tr>
<tr><td>10</td><td>Results display
The measurement results for circle (A) are displayed on the screen.
  </td><td>N0001
X = 6.001
Y = 6.005
D1 = 4.018 +NG

<Remarks>
If the deviation exceeds the tolerance zone, “+NG” or “-NG” is displayed as GO/NG judgment result.</td></tr>
</table>

5 AI Measurement

This chapter presents practice for measurements utilizing artificial intelligence (AI), using the model workpiece.

5.1 AI Measurement Function

The AI measurement (Artificial Intelligence measurement) is a function of automatically recognizing the type of the measured basic feature, such as a circle, a straight line, etc. from measured points data. The following types of basic feature can be automatically recognized by the system using the AI function.

Table 5-1-1

	Type of feature		Applicable number of measurement points	Remarks
1	Point		1-100	
2	Line		2-100	
3	Circle		3-100	
4	Distance		2	
5	Ellipse		5-100	
6	Rectangular hole		5	
7	Slot		9	
8	Point & angle		2-50 each	Measures two lines.

TIP See Chapter 4 of the “Software Guide” for further details on the AI function.

5.2 Performing AI Measurement

[Purpose of Practice]

To practice measurements utilizing the AI function using the model workpiece. In this section, line (A), circle (B) and angle (C) are measured successively in the AI measurement mode.

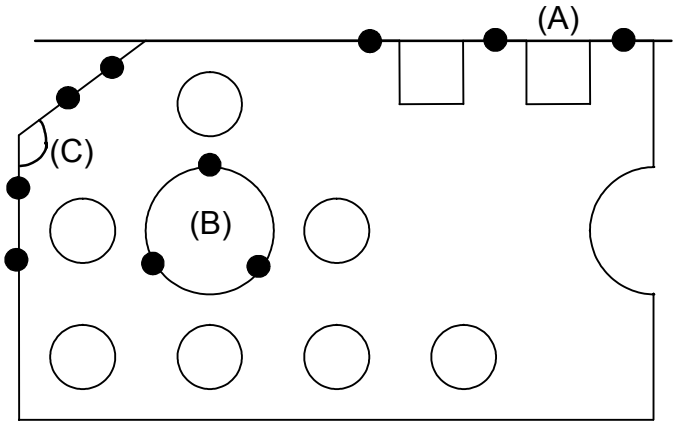
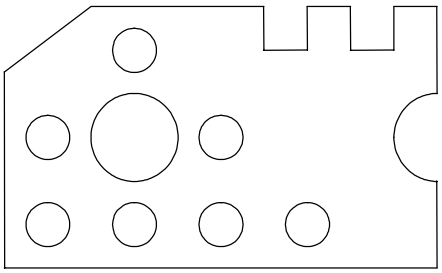
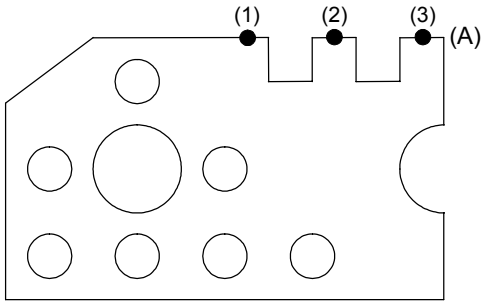
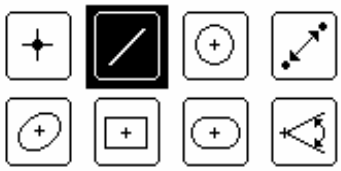
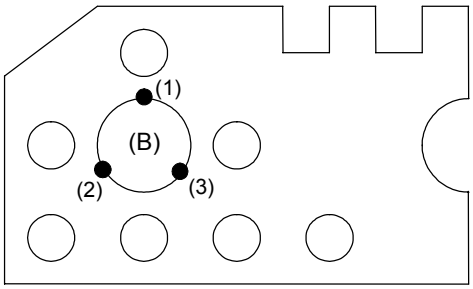
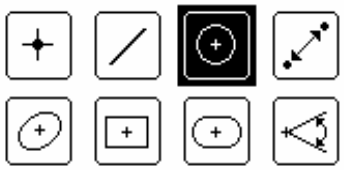


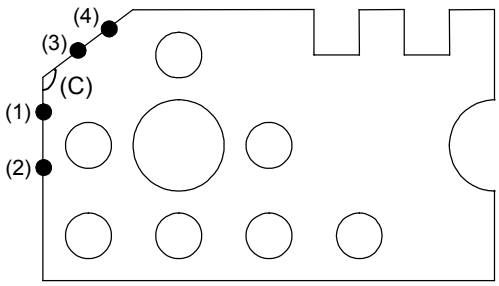
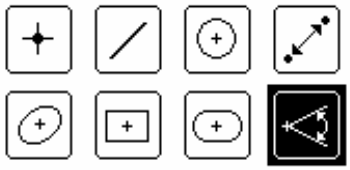
Fig. 5-2-1

[Operating Procedure]

Table 5-2-1

No.	Operation	Screen display and remarks
1	**Preparing the workpiece** Set the model workpiece on the XY table as shown below, and focus on it. 	–
2	**Aligning the part coordinate system** For the aligning procedure, see Section 3.2 “Aligning Part Coordinate System Using Edges as Reference”.	The explanation for the operations from step 3 onward assumes that the part coordinate system has been aligned.

No.	Operation	Screen display and remarks
3	**Setting the AI measurement function to ON** Press .	–
4	**Measuring line (A)** Measure three points on line (A). 	 **<Remarks>** The icon corresponding to the automatically recognized basic feature type is highlighted.
5	**Completion of line (A) measurement** After the desired measured points have been entered, press the [F5] function key corresponding to .	–
6	**Results display** The measurement results for line (A) are displayed.	**N0001** **CX = 0.0835** **F1 = 0.012**
7	**Measuring circle (B)** Measure three points on circle (B). 	 **<Remarks>** The icon corresponding to the automatically recognized basic feature type is highlighted.

No.	Operation	Screen display and remarks
8	**Completion of circle (B) measurement** After the desired measured points have been entered, press the [F5] function key corresponding to .	–
9	**Results display** The measurement results for circle (B) are displayed.	**N0002** **X = 6.083** **Y = 6.012** **D = 4.000**
10	**Measuring angle (C)** Measure four points on the two lines forming angle (C). 	 **<Remarks>** The icon corresponding to the automatically recognized basic feature type is highlighted.
11	**Completion of angle (C) measurement** After the desired measured points have been entered, press the [F5] function key corresponding to .	–
12	**Results display** The measurement results for angle (C) are displayed.	**N0003** **X = 0.083** **Y = 0.012** **A1 = 119.4837** **A2 = 240.1123**

TIP If the automatically recognized feature type is not appropriate, the feature type can be manually corrected. See Chapter 4 of the “Software Guide” for information on how to correct feature type.