

# QM-DATA 200

Bulletin No. 1835



**2D Coordinate Measurement  
Geometry Calculation System**

**Mitutoyo**

# QM-Data 200



## FEATURES

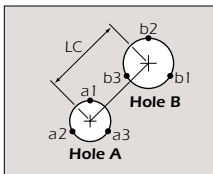
- Various graphic displays on the large LCD screen for easy measurement operations.  
Measurement procedure display (Navigation for measurement operation)  
Graphic display of measurement result  
A measuring position guide is displayed in repeated measurement (measuring position navigation).
- One-key operation for combined measurements that are often used (circle-circle distance, etc.)
- The AI measurement function (automatic identification of measuring item) eliminates switching between the measurement command keys.
- Equipped with measurement procedure teaching function and the measuring position navigation in Repeat mode.
- The user menu function allows users to register measurement commands or part programs to create his/her own menu.
- Tolerance zone measurement of data processing result and various statistical processing for each item are available.
- Measurement result output to "MS-Excel<sup>®</sup>" in spreadsheet (CSV) format
- The measurement procedure and measurement result can be saved, using the optional floppy disk drive unit.
- Two models are available: a stand-alone type with tilt system and a flexible arm type that can be mounted on a Profile Projector.

\*MS-Excel is a registered trademark of Microsoft Corporation.

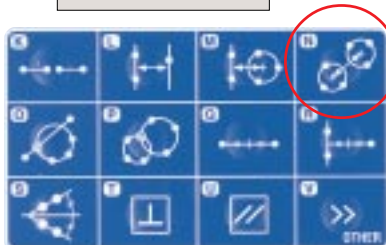


## Experience measurement efficiency with the QM-Data 200.

### Measure the distance between the centers of round holes A and B.



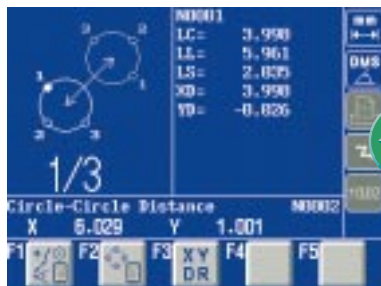
The comprehensive key panels of the QM-Data 200 make it easy for any operator to use. Measurements of combined elements such as circle-to-circle distance, etc., can be measured via one-touch operation. Furthermore, the measurement procedure navigation display, which indicates the next data entry position during a measurement, makes it possible for a beginner to know at a glance where the next measuring position is.



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



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



4. The measurement result is displayed.



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





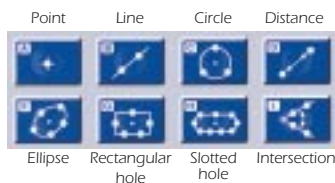
# Functions for Faster, Easier and More Efficient Measurement!

## AI MEASUREMENT FUNCTION

With the AI measurement function (Automatic Element-Identification function), elements can be automatically identified based on data input from the measuring points. This function allows the continuous measurement of different elements, eliminating key entry for each element.

### Elements that can be identified using the AI function

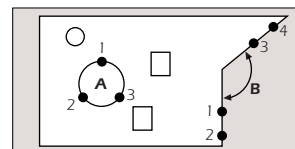
In the following, one of the two has to be selected: [Line and distance] [Ellipse and rectangular hole] [Ellipse and slotted hole]



1. Select the [AI MEASUREMENT] key.



2. Input data from the three measuring points of inside diameter (A).



3. End the measurement. (Press F5)



7. The measurement result of the angle is displayed.



6. End the measurement. (Press F5)



5. Input data from the four measuring points of angle (B)



4. The measurement result of the inside diameter is displayed.

\*Not available during measurement using the AI function.

## The coordinate entry function

In a measurement using the coordinate entry function, 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 the [RECTANGULAR HOLE CENTER] in the coordinate entry format.

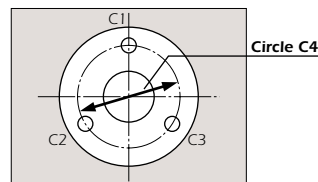
### Measurement of a pitch circle whose circumference intersects with the three hole centers



2. Press [COORDINATE ENTRY FORMAT].



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



3. Measure circle C1 (entry of four points). Likewise, measure circles C2 and C3.

Measurement status of pitch circle display unit



Coordinate entry format display unit

4. Select the center of each circle (entry of four points).



5. The diameter of a pitch circle (C4) can be found.

## Types of coordinate entry formats



### Directly entered points

Use the point that has been entered as a measuring point



### Midpoint between the two

Use the midpoint between the two points 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 circle (four points)

Use the center of the circle whose 4 points have been entered, as a measuring point.



### Center of ellipse

Use the center of the ellipse as a measuring point.



### Center of rectangular hole

Use the center of the rectangular hole as a measuring point.



### Center of slotted hole

Use the center of the slotted hole as a measuring point.



### Intersection of two straight lines

Use the intersection of the two straight lines as a measuring point.

## Navigation of measuring position

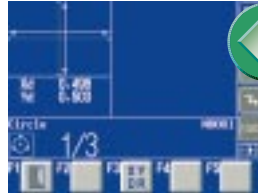
When using the repeat function to execute the measurement procedure (part program) created with the teaching function, this function will guide the operator to the next measuring point. The next measuring point is indicated when the cross-hairs located at the center of the navigation display are placed on the other cross-hairs, which indicate the next measuring point. The operator is guided to the next measuring point also by moving the stage to a position where the digital counter reading approaches zero.



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



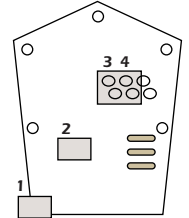
3. When the cross-hairs overlap, it is close to the next measuring point.



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



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



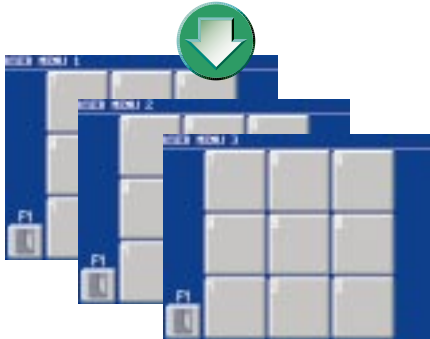
### Teaching function

When measuring more than one specimen of the same form, the series of key operations performed in the measurement of the first specimen can be stored as a part program.

## USER MENU

The user can customize the QM-Data200 to best suit their needs by registering frequently used measurement commands and necessary functions such as part programs, etc., to create an original menu (up to 3 menus).

[USER MENU] key



### Example of user menu registration



Measurement command

User macro

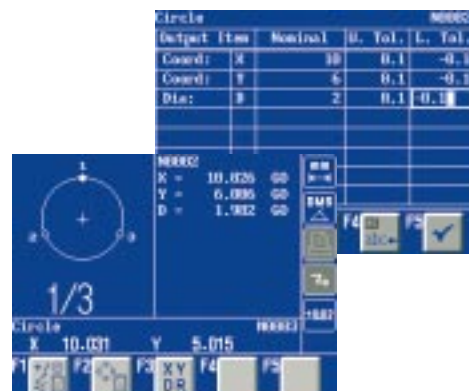
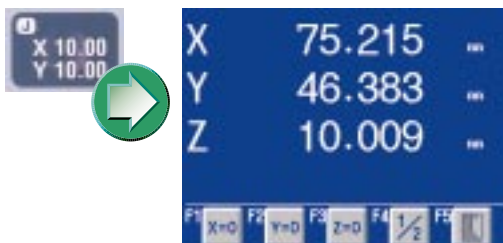
Part program

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

## Other functions

### Counter function

The QM-Data200 can be used as a counter, when it is directly connected to a linear scale. Featuring the zero-set and 1/2 display functions.

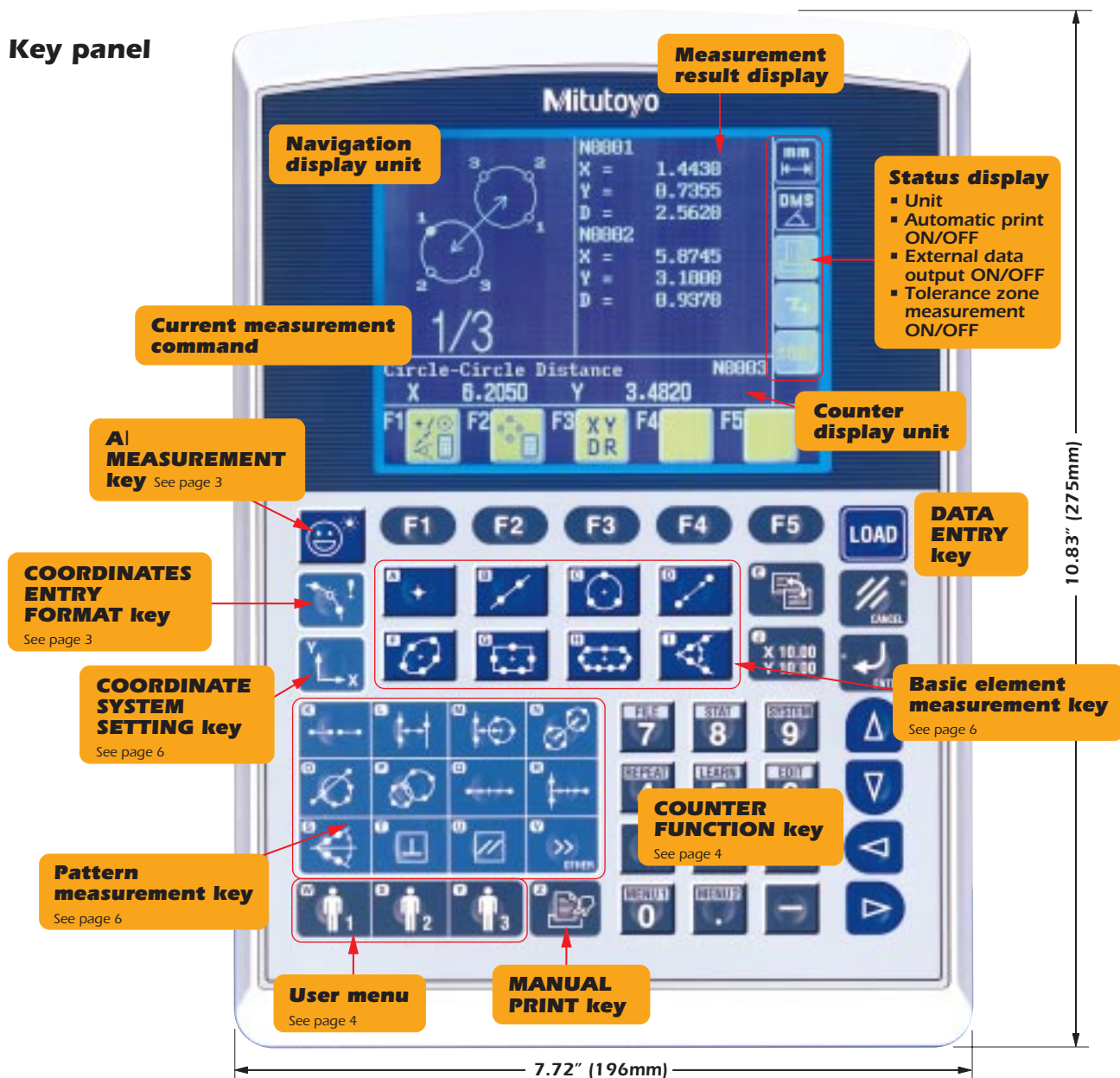


### Tolerance zone measurement function

With this function, when nominal value and tolerance limits (upper and lower limits) are given, the difference between the measured value and the nominal value is compared with the tolerance zone.

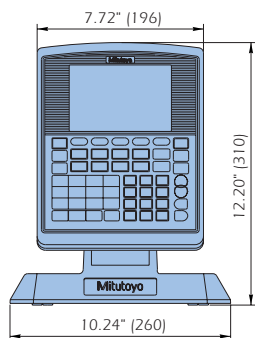


## Key panel

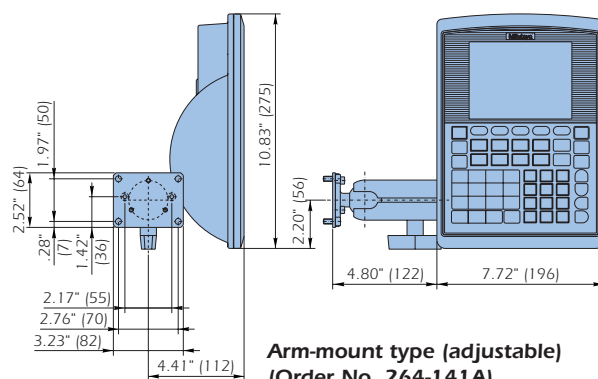
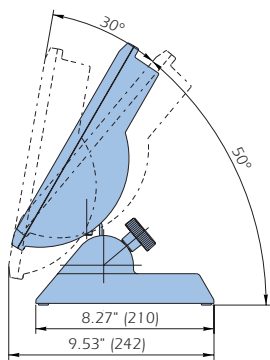


## Dimensions

Unit: inch (mm)



Stand-mount type (Order No. 264-140A)



Arm-mount type (adjustable)  
(Order No. 264-141A)

# A variety of measurement commands for all the basic measurements.

## Basic element measurement key



**Point**  
Coordinates (The multi-point processing allows data processing of up to 100 measuring points)  
\* In the multi-point processing, mean value is used as measured value.



**Point-point distance**  
Distance, Coordinates difference



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



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



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



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



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



**Rectangular hole**  
Center coordinates, length, width

The item described here as the measurement result output is the factory setting.

## Creating the coordinate system



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



**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 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.



**Compensation of offset axis**  
Rotate the coordinate system until the measuring point comes to the specified position. (Do not transfer the origin.)



**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.



**Saving, recalling, and resetting the coordinate system**  
Saving, recalling, and resetting the coordinate system



**Determining axis by line**  
Rotate the coordinate system in such a way that it becomes parallel to the measured line. (Do not translate the origin.)



**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.

## Pattern measurement key



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



**Line-circle intersection**  
Coordinates of intersection



**Centerline between lines**  
Angle with the X-axis



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



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



**Line-point distance**  
Vertical distance



**Intersection of circles**  
Coordinates of intersection



**Perpendicularity**  
Perpendicularity



**Point-circle tangent point**  
Coordinates of tangent point



**Midpoint between circles**  
Coordinates of midpoint



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



**Midpoint between points**  
Coordinates of midpoint



**Parallelism**



**Circle-circle tangent line**  
Angle with the X-axis



**Projected point**  
Coordinates of the point projected on a line



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



**Midpoint between line and point**  
Coordinates of midpoint



**OTHER**  
Key menu



**Corner**  
Diameter, radius of corner circle, center coordinates

The item described here as the measurement result output is the factory setting.

## Optional accessories

### Receipt printer

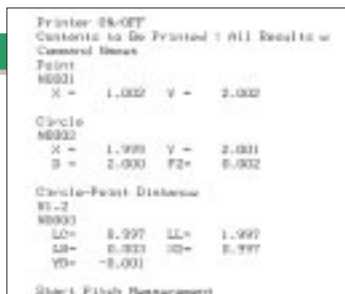
Order No. 12AAD034



- Used to print out measurement results.

#### Optional Accessories

Code No. 908353 Recording paper for receipt printer (5 rolls/set)



Printing method	Thermal serial dot
Printing digits	40 digits
Maximum print speed	52.5cps (normal characters)
Dimensions	6.30" W x 6.69" D x 2.58" H (160mm W x 170mm D x 65.5mm H) (printer body)
Standard accessories	Printer cable, recording paper (1 roll), AC adapter (100V)

\*Supports external printer (color or black & white) for ESP/C  
Printer control code system: ESC/P, MS-DOS 24 pins  
Printer cable 2m (Code No. 12AAA804)... optional

### Adjustable Stage

Order No. 172-270

- The maximum loading capacity is 60kg.

### FDD Unit

Order No. 12AAA799



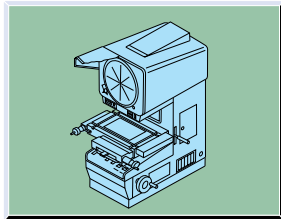
- It is used to save measurement procedures and measurement result files.

# Mitutoyo



## SYSTEM CONFIGURATION

### Main unit with SPC output



PJ-A3000 series  
PJ-H3000 series, PJ-500  
PH-3515F (172-847)  
TF-500 series

SPC cable  
936937 (1m) x2pcs.



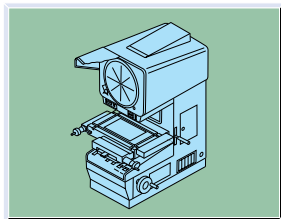
MUX-10F  
264-002

DMX-2  
12AAD538

### Direct connection

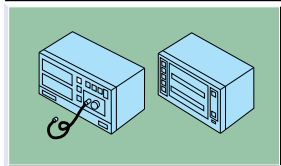
All profile projectors with  
the linear scale X Y stage  
can be connected directly.

### Main unit with RS-232C output



PJ-A3000D/F series  
MF-A series  
MF-UA series

RS-232C cable (2m)  
12AAA807



KC Counter (MF-H100)  
KS Counter (PV)  
Optoeye A2 Counter

Connecting cable B  
12AAD193

Connecting  
cable D  
12AAD195

Connecting  
cable C  
12AAD194

For RS-232C input (Connected to  
the measuring instrument counter)

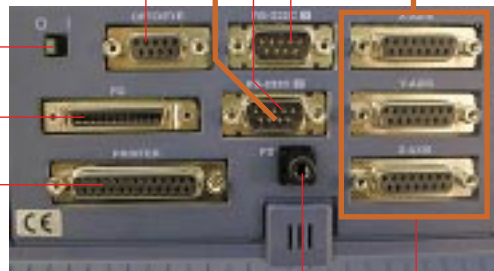
For Optoeye's edge signal input

For RS-232C  
output  
(Connected to PC)

Power  
switch

For FDD  
unit  
connection

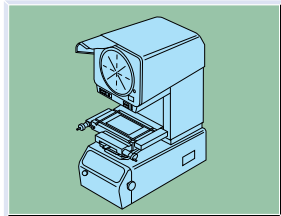
For printer  
connection



For linear scale input

For footswitch input

### Main unit with built-in Optoeye



PJ-H3000F4 series

Connecting cable E  
12AAD196

## QM-Data200 Specifications

Order No.	Stand-mount type 264-140*	Arm-mount type 264-141*
Display languages (selectable)	Japanese/English/German/French/Italian/Spanish/Portuguese	
Measured value unit	mm Angle: degree/degree minute second (selectable)	
Resolution	.000004" (0.0001mm)	
Program functions	Part program creation, execution, editing.	
Statistical processing	Number of data, maximum value, minimum value, mean value, standard deviation, range, histogram	
Number of elements that can be stored in the memory	Maximum of 1000 elements	
Element recall	Point, line, circle, distance, ellipse, rectangular hole, slotted hole, intersection and intersecting angle	
Element key-in	point, line, circle	
Display system	Monographic LCD (320 x 240 dots, with back light)	
Input connector	RS-232C 2: For connecting the measuring instrument's counter X, Y, Z: Linear scale input (for the no-counter type) OPTOEYE: Optoeye edge signal [Note] Available only with linear scale input FS: For connecting the footswitch	
Output connector	RS-232C 1: For connecting PC (measurement result) PRINTER: For connecting a receipt printer or an external printer (measurement result) FD: For connecting the floppy disk drive unit (measurement result file, measurement procedure file)	
Measurement result file output	RS-232C output (CSV format, MUX-10 format)	
Power	AC100V 50/60Hz (AC adapter used)	
Maximum power consumption	24W (does not include optional accessories)	
Outer dimensions (WxDxH)	Approximately 10.24"x9.53"x12.20" (260 x 242 x 310mm) (including the stand)	Approximately 12.52"x6.02"x108.31" (318 x 153 x 2751 mm) (when the arm is in the horizontal position)
Mass	Approximately 4.85 lbs (2.2 kg)	Approximately 4.63 lbs (2.1kg)
Applicable models	PJ/PJ-H/PV series, PJ-A3000 series (except the fixed-stage type) PH-3515F (172-847)	PJ-A3000 series (except the fixed-stage type), PV-5000, PH-3515F (172-949)
Standard accessories	AC adapter, power cable	

\* To denote your AC line voltage add the following suffixes (e.g. 264-140A) F for 120V, C for 110V, D for 220V, E for 270V. No suffix is required for 100V



**Note:**

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Optical Measuring	_____
Sensor Systems	_____
Hardness Measuring	_____
Digital Scale and DRO Systems	_____
Small Tool Instruments and Data Management	_____

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**Precision is our Profession**