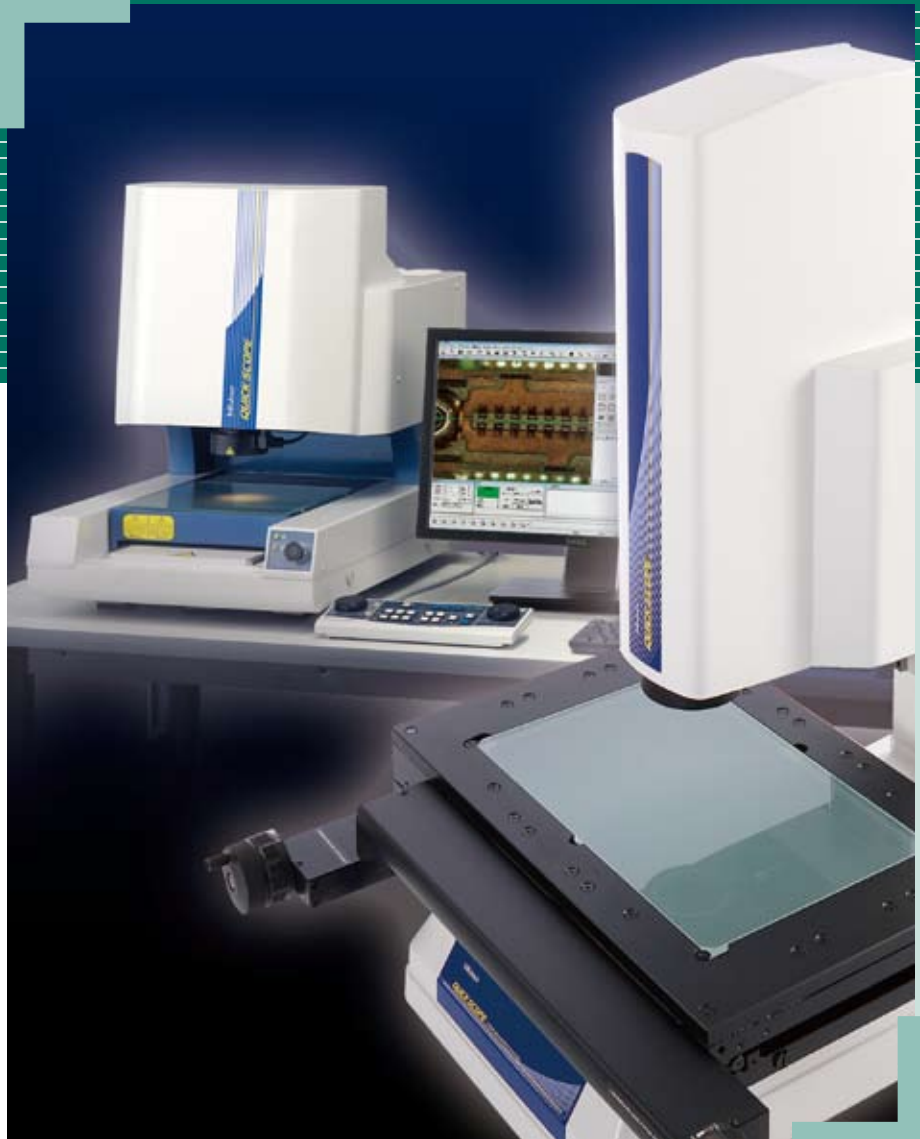


# Vision Measuring Systems QUICK SCOPE Series

Catalog No.E14004



# Refined Measurement Capabilities

## "Intuitive Operation" and "High Precision Measurement"



Standard Software

Optional Software

### Software

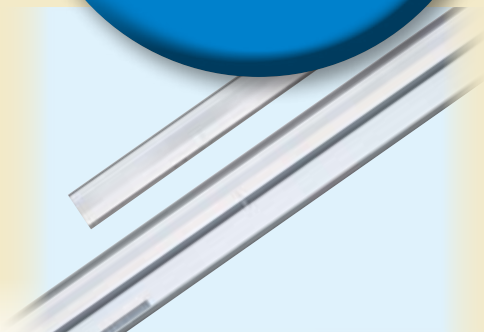
Intuitive software makes equipment operation easy for anyone.

### High-Accuracy

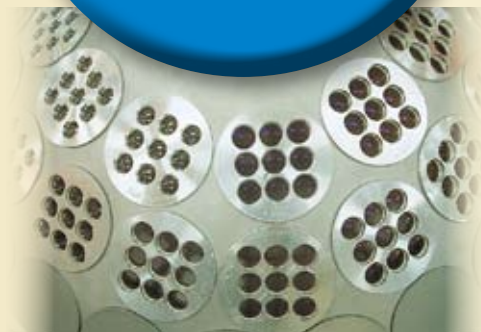
Industry-leading liner scale is equipped with X, Y and Z axes.

### Optical

Optical technologies designed to take the place of a human eye.



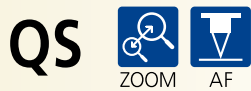
Glass scales



Lens design and manufacturing

The Quick Scope series can be used by anyone to easily perform everything from observation to automatic measurement of single or multiple items. Image measurement software QSPAK, which offers intuitive operability and advanced functionality can solve your measurement challenges. Used with the FORMPAK-QV application software, the Quick Scope series can also perform form analysis.

## Series Lineup



Motor driven X, Y, and Z axes (zoom optics)

**CNC**

Measuring Range (XxYxZ): 200x250x100mm  
Field of View: 9.5x7.1mm~1.3x1.0mm



Manual X and Y axes, motor driven Z axis (zoom optics)

**XY: Manual Z: CNC**

Measuring Range (XxYxZ): 200x100x150mm  
300x170x150mm  
400x200x150mm  
Field of View: 9.5x7.1mm~1.3x1.0mm



Manually operated X, Y, and Z axes (zoom optics)

**Manual**

Measuring Range (XxYxZ): 200x100x150mm  
300x170x150mm  
400x200x150mm  
Field of View: 8.8x6.6mm~1.2x0.9mm



\* See P6-P8 for detailed specifications.

# Drastic Improvement in Working Efficiency Thanks to Functions Focused on Operability

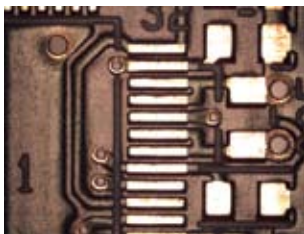
## ■ Programmable Optical Zoom

Low to high magnification zooming provides support for both wide-field observation and high-magnification measurement, without the need to change lenses. The working distance is a constant 55mm, regardless of the magnification. The long working distance makes it possible to perform measurement on even uneven workpieces using the optimal magnification.

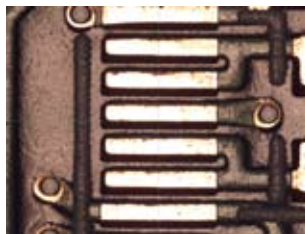
The QS series provides a full set of automatic correction features, such as automatic light adjustment associated with a zooming operation, automatic position adjustment, pixel calibration, and more.

**QS, QS-L/AFB:** 0.5X-3.5X (zoom ratio 7X in 8 steps)  
(26X-180X)\*

**QS-LZB:** 0.75X-5.25X (zoom ratio 7X in 8 steps)  
(29X-202X)\*



0.75X (29X)\*



1.5X (58X)\*



3X (116X)\*



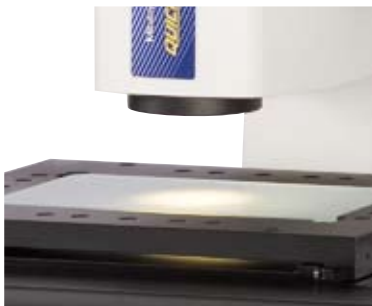
5.25X (202X)\*

Fixed 55mm working distance

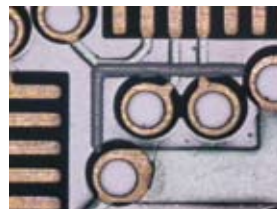
\* Total magnification shown in the above table is a reference value displayed in the default window state when using 22-inch wide LCD monitor.

## ■ Illumination functions provide excellent support for measurement and observation

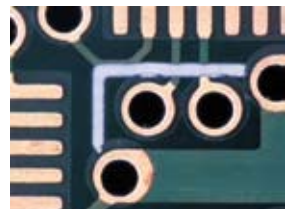
In addition to contour and surface illumination, Quick Scope is equipped with a fiber-optic ring light to aid in reproducing color images more clearly. This illumination enables measurement and observation of images under optimal conditions.



Contour (stage) illumination



Surface (coaxial) illumination



Fiber-optic ring illumination

During auto-measurement the measurement procedure program exercises automatic control over the illumination system, providing compatibility between user-friendliness and high efficiency.

## ■ Control box

Frequently-used operations such as illuminating, data entry, zooming, and auto-focusing\* can be performed with a single touch of individual buttons conveniently positioned near at hand.

The CNC **QS** system allows remote operation with a jog shuttle. The manual **QS** system can be operated with a single touch of a button in the case of repeated measurement.

\* Auto-focusing function available only in **QS** and **QS-L/AFB**



For **QS**



For **QS-L/AFB**



For **QS-LZB**

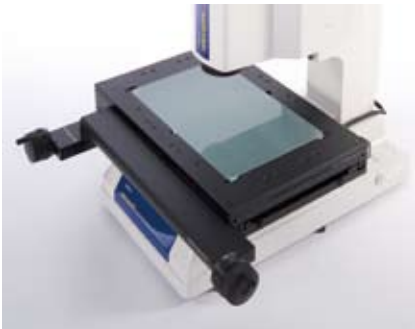
**Mitutoyo**



## ■ Stage sizes

Allows selection of the perfect size of stage for the objects you need to measure.

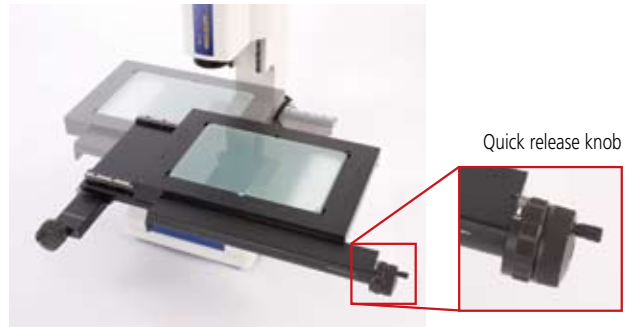
- **QS (X×Y)** : 200×250mm
- **QS-L/AFB (X×Y)** : 200×100mm, 300×170mm, 400×200mm
- **QS-LZB (X×Y)** : 200×100mm, 300×170mm, 400×200mm



## ■ Quick release mechanism

Applicable models: **QS-L/AFB, QS-LZB**

A quick release mechanism is installed on the XY stage of these models. Stage feed can be switched between Coarse and Fine (FREE and LOCK). Since this mechanism puts the stage in a completely free state, it greatly eases moving the stage if it is a long way to the next measuring point.



## ■ AF tool

Applicable models: **QS, QS-L/AFB**

The AF (Auto focus) tool allows focusing without operator error, thereby achieving high-accuracy height measurement.

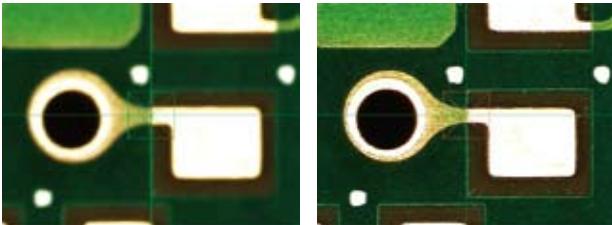


Image before AF

Image after AF

## ■ Ambidextrous Z-axis feed

Applicable models: **QS-LZB**

Z-axis knobs are fitted to both sides of the column, making it easy to use for both left- and right-handed operators.

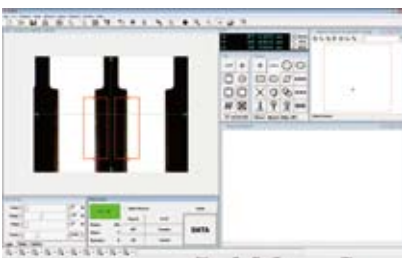
The outside coarse-feed knob adjusts the Z axis 30mm per revolution, and the inside fine-feed knob feeds at 0.2mm per revolution.

A contrast level meter is displayed, improving repeatability of focal positions in manual focusing.

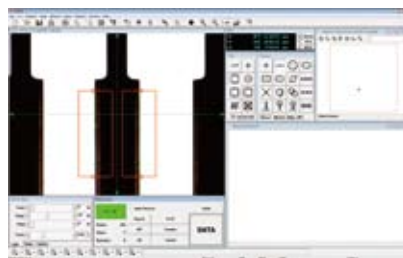


## ■ Digital zoom function

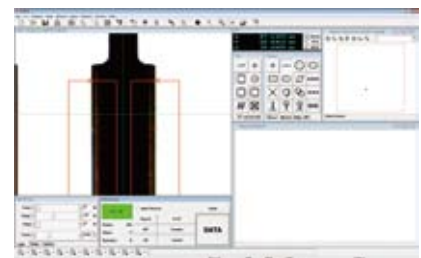
Digital zoom enables enlarged display and measurement of every detail.



Low magnification



Medium magnification



High magnification

# CNC Vision Measuring System

## QS



**QS250Z**

\* Printer is an optional accessory. An optional printer is not always the same as the above picture.

### Specifications

Zoom lens system	Model Order No.	<b>QS250Z</b> <b>359-508-10*1</b>
Drive method		X axis / Y axis / Z axis : CNC
Optical Magnification*2		Zoom: 0.5X-3.5X (in 8 steps)
Measuring range (X×Y×Z)		200×250×100mm
Resolution/Length standard		0.1μm/Linear encoder
Image detecting unit		1/3" Color CCD camera
Measuring accuracy*3	EiX, EiY	(2.5+6L/1000)μm
	EiZ	(5.0+6L/1000)μm
Operating temperature range		20±1°C
Drive speed		Max 80mm/s
Acceleration and deceleration		Max 250mm/s <sup>2</sup>
Stage glass size		269×311mm
Maximum stage loading		10kg
Illumination		Stage light: 12V/30W Halogen
		Co-axial light: 12V/50W Halogen
		Ring fiber light: 12V/100W Halogen
Dimensions (W×D×H)mm		465×815×663mm
Mass		76kg
Power consumption*4		500W at max

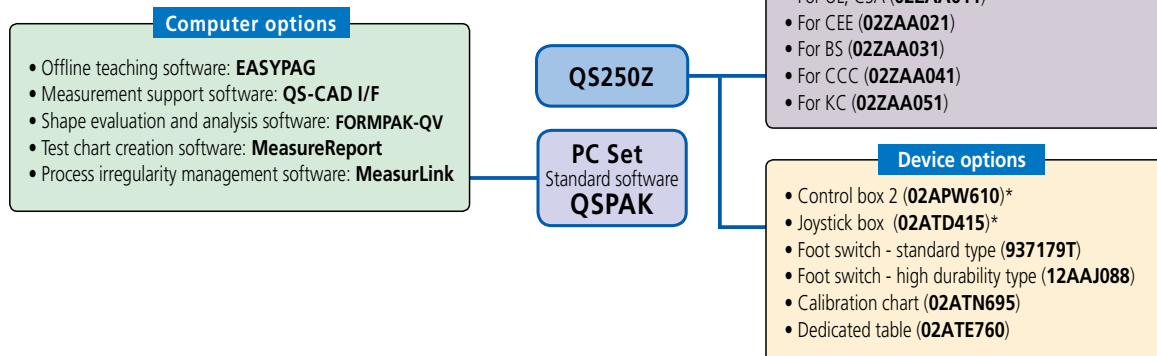
\*1 The following suffixes are added to the Order No. 359-508-10: "Z" for UL/CSA and "Y" for CEE, BS, CCC, and KC  
Power cord is not attached as a standard accessory and it is required to prepare separately depending on the connector form.

\*2 Monitor magnification ratios unavailable.

\*3 Measuring accuracy (zoom lens system: 2.5X at the time of zooming in) under an installation environment of 20°C.

\*4 Only of QS main unit (excluding PC and monitor).

### System diagram



\* Concurrent use is impossible.

### Optical system magnification ratios available for QS

Total magnification Field of View (mm)	26X 9.5×7.1	34X 7.3×5.4	44X 5.6×4.2	52X 4.7×3.5	78X 3.1×2.3	103X 2.3×1.7	129X 1.9×1.4	180X 1.3×1.0
<b>QS</b>	●	●	●	●	●	●	●	●
Working distance (mm)	0.5X	0.65X	0.85X	1X	1.5X	2X	2.5X	3.5X
	55							

\* Total magnification shown in the above table is a reference value displayed in the default window state when using 22-inch wide LCD monitor.

# Manual Vision Measuring Systems

## QS-L/AFB



QS-L3017Z/AFB

\* Printer is an optional accessory. An optional printer is not always the same as the above picture.

### Specifications

Zoom lens system	Model Order No.	QS-L2010Z/AFB 359-703*1	QS-L3017Z/AFB 359-704*1	QS-L4020Z/AFB 359-705*1
Drive method		X axis/Y axis : Manual Z axis : CNC with Auto focus		
Optical Magnification*2		Zoom: 0.5X-3.5X (in 8steps)		
Measuring range (X×Y×Z)		200×100×150mm	300×170×150mm	400×200×150mm
Resolution/Length standard		0.1μm/Linear encoder		
Image detecting unit		1/3" Color CCD camera		
Indication accuracy*3	X, Y	(2.5+20L/1000)μm		
	Z	(5.0+6L/1000)μm		
Operating temperature range		20±1°C		
Stage glass size		250×150mm	370×240mm	440×240mm
Maximum stage loading		10kg	20kg	15kg
Illumination		Stage light: 12V30W Halogen Co-axial light: 12V50W Halogen Ring fiber light: 12V100W Halogen		
Main Unit	Dimensions (W×D×H)mm*4	624×705×722mm	682×852×837mm	757×867×837mm
	Mass	66kg	134kg	140kg
Power Unit	Dimensions (W×D×H)mm	186×452×381mm		
	Mass	14kg		
Power consumption*5		400W at max		

\*1 To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix are required for PSE.

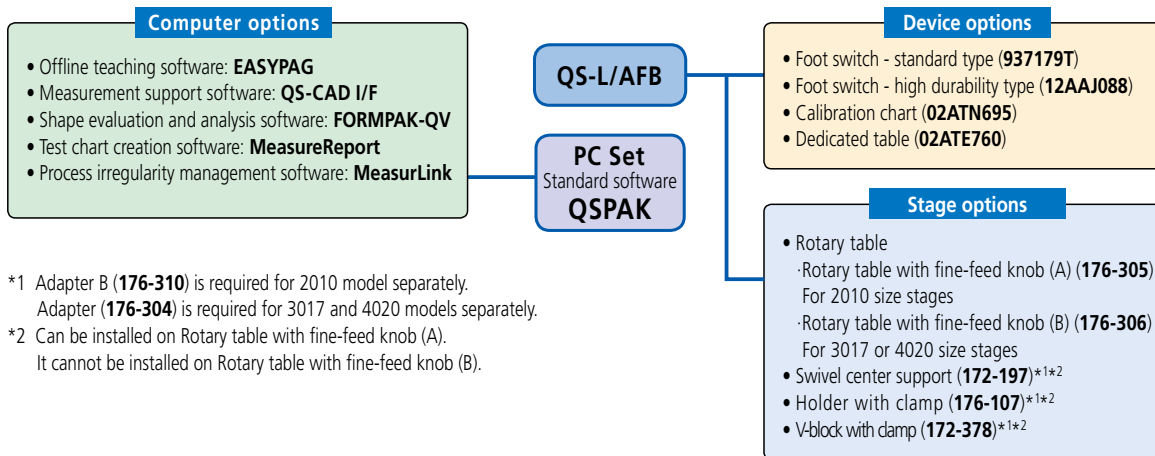
\*2 Monitor magnification ratios unavailable.

\*3 Measuring accuracy (zoom lens system: 2.5X at the time of zooming in) under an installation environment of 20°C.

\*4 The width and height increase by the amount of the X axis and Z axis stroke at the maximum. The depth increase by the amount of half of the Y axis stroke at the maximum.

\*5 Only of QS main unit (excluding PC and monitor).

### System diagram



\*1 Adapter B (**176-310**) is required for 2010 model separately.  
Adapter (**176-304**) is required for 3017 and 4020 models separately.

\*2 Can be installed on Rotary table with fine-feed knob (A).  
It cannot be installed on Rotary table with fine-feed knob (B).

### Optical system magnification ratios available for QS-L/AFB

Total magnification Field of View (mm)	26X 9.5×7.1	34X 7.3×5.4	44X 5.6×4.2	52X 4.7×3.5	78X 3.1×2.3	103X 2.3×1.7	129X 1.9×1.4	180X 1.3×1.0
<b>QS-L/AFB</b>	0.5X	0.65X	0.85X	1X	1.5X	2X	2.5X	3.5X
Working distance (mm)	55							

\* Total magnification shown in the above table is a reference value displayed in the default window state when using 22-inch wide LCD monitor.

# Manual Vision Measuring Systems

## QS-LZB



QS-L2010ZB

\* Printer is an optional accessory. An optional printer is not always the same as the above picture.

### Specifications

Zoom lens system	Model	QS-L2010/ZB	QS-L3017/ZB	QS-L4020/ZB
	Order No.	359-710-1*1	359-711-1*1	359-712-1*1
Drive method		X axis / Y axis / Z axis : Manual		
Optical Magnification*2		Zoom: 0.75X-5.25X (in 8steps)		
Measuring range (XxYxZ)		200x100x150mm	300x170x150mm	400x200x150mm
Resolution/Length standard		0.1µm/Linear encoder		
Image detecting unit		1/2" Color CMOS camera		
Indication accuracy*3	X, Y	(2.5+20L/1000)µm		
	Z	(5.0+40L/1000)µm		
Operating temperature range		20±1°C		
Stage glass size		250x150mm	370x240mm	440x240mm
Maximum stage loading		10kg	20kg	15kg
Illumination		Stage light: 12V/50W Halogen Co-axial light: 12V50W Halogen Ring fiber light: 12V/100W Halogen		
Main Unit	Dimensions (WxDxH)mm*4	624x769x722mm	682x916x837mm	757x930x837mm
	Mass	72kg	140kg	146kg
Power Unit	Dimensions (WxDxH)mm	310x330x102.5mm		
	Mass	5kg		
Power consumption*5		160W at max		

\*1 To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix are required for PSE.

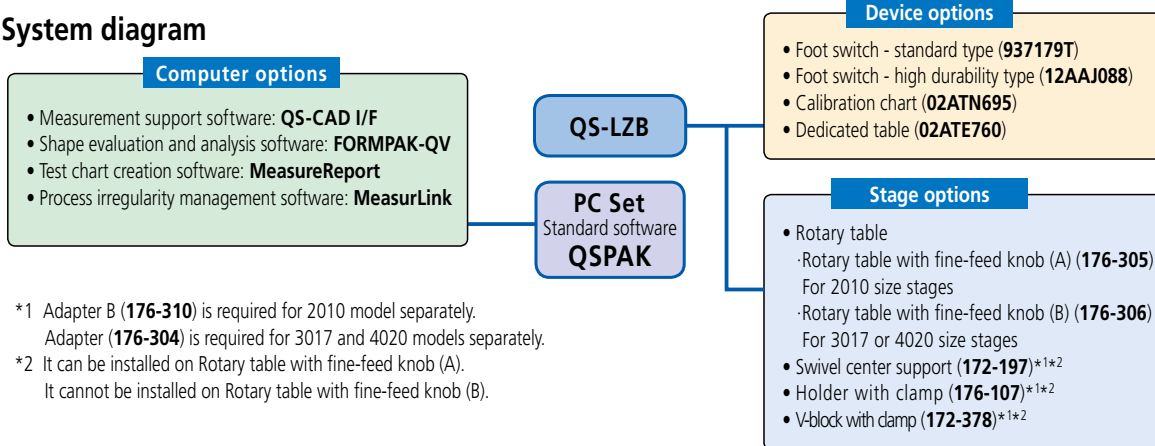
\*2 Monitor magnification ratios unavailable.

\*3 Measuring accuracy (zoom lens system: 3X at the time of zooming in) under an installation environment of 20°C.

\*4 The width and height increase by the amount of the X axis and Z axis stroke at the maximum. The depth increases by the amount of half of the Y axis stroke at the maximum.

\*5 Only of QS main unit (excluding PC and monitor).

### System diagram



\*1 Adapter B (**176-310**) is required for 2010 model separately.

Adapter (**176-304**) is required for 3017 and 4020 models separately.

\*2 It can be installed on Rotary table with fine-feed knob (A).

It cannot be installed on Rotary table with fine-feed knob (B).

### Optical system magnification ratios available for QS-LZB

Total magnification	29X	38X	49X	58X	87X	116X	145X	202X
Field of View (mm)	8.8x6.6	6.8x5.1	5.2x3.9	4.4x3.3	2.9x2.2	2.2x1.6	1.7x1.3	1.2x0.9
<b>QS-LZB</b>	0.75X	0.98X	1.28X	1.5X	2.25X	3X	3.75X	5.25X
Working distance (mm)	55							

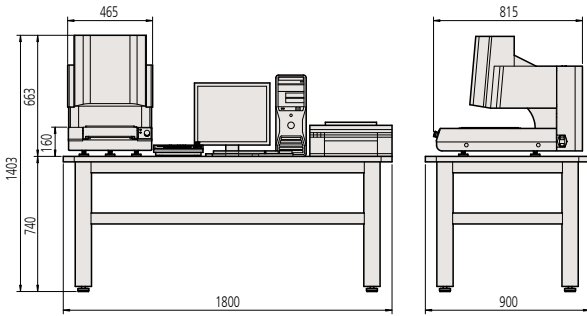
\* Total magnification shown in the above table is a reference value displayed in the default window state when using 22-inch wide LCD monitor.



# Dimensions

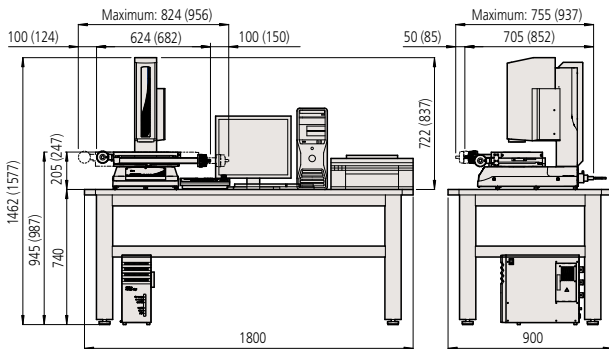
## ■ QS250Z

Unit: mm

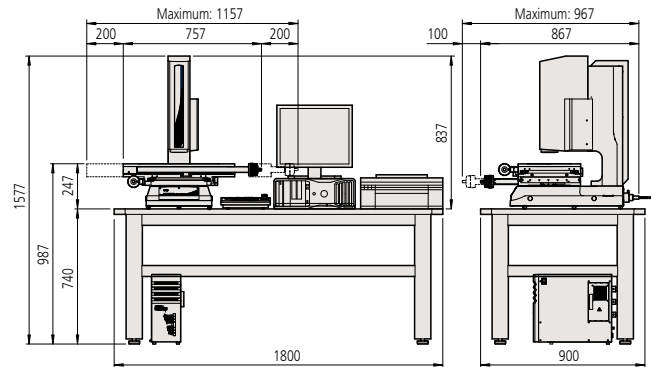


## ■ QS-L/AFB

2010/3017 Dimensions in parentheses indicate those for model 3017.

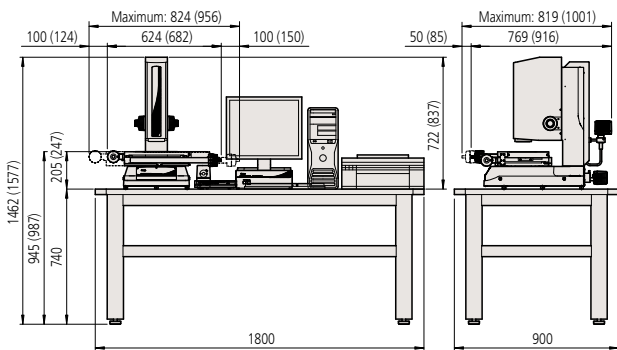


## 4020

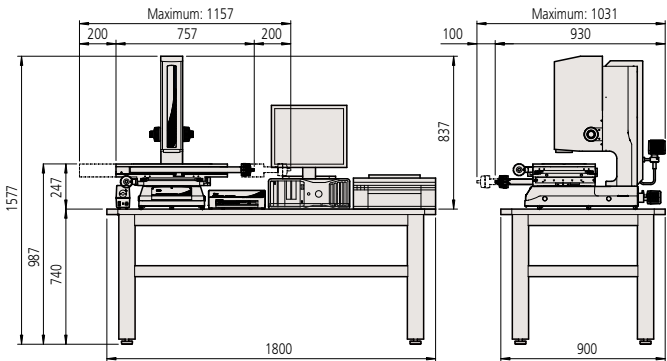


## ■ QS-LZB

2010/3017 Dimensions in parentheses indicate those for model 3017.



## 4020



# QSPAKR – A powerful vision measuring software system that supports a wide variety of measurement

In order to support various measuring methods from measurement of a wide variety of single parts to CNC measurement of mass production parts, **QSPAK** has achieved both high-reliability vision detecting capability and user-friendly operability.

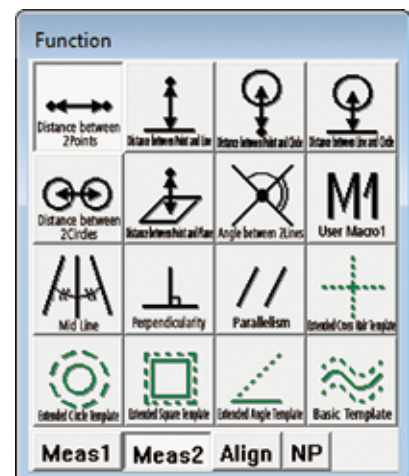
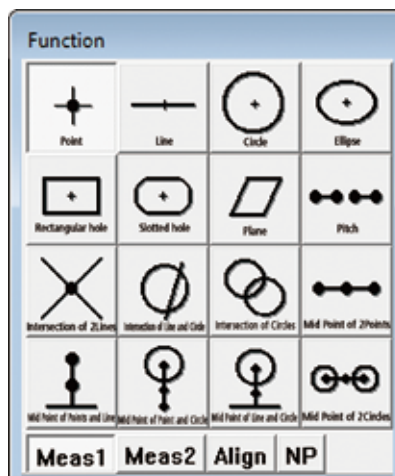


## Measurement Commands Covering Basic Methods of Measurement

### Coordinate system creation commands



### Measurement item commands

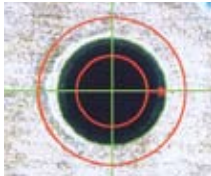


\* Item names are not actually displayed, but displayed as on-line help.

## Tools that Reduce Personal Error and Improve Repeatability

### One-click tools ● Patent pending (Japan)

A single click in the vicinity of a workpiece edge allows automatic processing from tool setting to edge detection/calculation. Additionally, this function does not need stage movement for any workpiece measurement within a screen, drastically reducing measurement time.



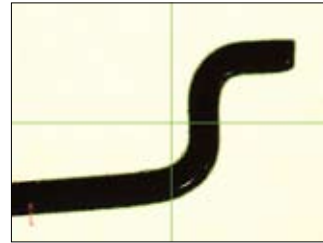
One-click circle tool



One-click box tool

### Auto-trace tool

This is a tool for form measurement in which the edge of an arbitrary form is detected with multiple points at a time.



\* The Auto-trace tool of **QS-L/AFB** and **QS-LZB**, only functions within a screen.

## Convenient Tools Effective for Various Measuring points

### Multi-click Plus Arc Tool

Overall drawing tool size, scan direction size, and edge selector positions can be set as desired.

This tool is effective for the measurement of arcs with small R angles, and for objects with many irregularities, whose edges are not easily identified.

### Datum Circle Measurement

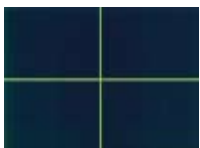
In addition to calculating mean-circle measurements using the standard least-square method, the QS series can also perform calculations based on interior diameter (maximum inscribed circle) and external diameter (minimum circumscribed circle).

This measurement approach is useful for circle measurement of the contact sides of fitted components, etc.

## Template tools

### Basic templates

The following are three basic templates corresponding to the reticle of a microscope.



Cross hairs



Crosshatch



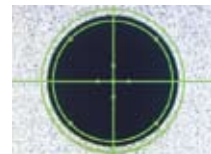
Concentric circles

### Extension templates

Extension templates are provided based on four types of pattern: cross-hair; circle; rectangle; and angle. A diameter, distance, angle, and other value can freely be set by key entry in the same manner as used in comparison measurement with a profile projector.



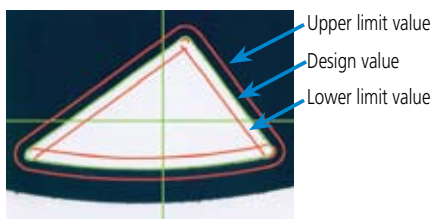
Angle template



Circle template

### User pattern matching

The user can freely create a template (master) to suit practically any a workpiece, different from the basic templates and extension templates to perform tolerancing with a master. Also, the user can easily perform tolerancing by displaying key-entered upper limit and lower limit lines on the screen.



Upper limit value

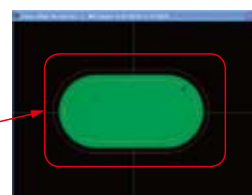
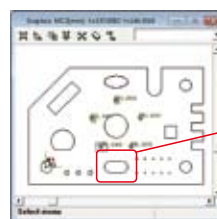
Design value

Lower limit value

### CAD user template function

This function allows a template to be created using a form (CAD data) in the Graphics window.

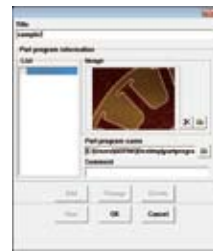
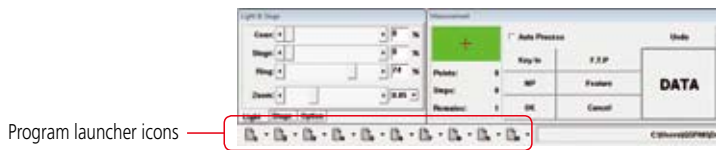
\* To create a template, CAD data needs to be imported and exported.



# Convenient Functions to Simply Execute and Edit an Auto-measurement Procedure Program

## One-click simple execution function – Program Launcher

An auto-measurement procedure program can be associated with a dedicated icon along with a photo and comments to enable a program to be started by a single click. A total of 10 icons are provided and programs can be managed for each operator or workpiece using these icons.



Auto-measurement procedure program association window

## Smart editor

This function allows an XY-stage position, lens magnification, illumination condition, etc., to be separately displayed as icons or labels in the list of part programs (auto-measurement procedure programs), thereby simplifying program editing.

Editing an illumination condition according to the dialog

Editing a direct tool on the Video window

Editing design values and tolerances according to the dialog

Result	TOL,Info	Stat Label
Result	Min/TOL	Max/TOL
0.0	0.0000	-0.0000
0.5		
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5.0		
5.5		
6.0		
6.5		
7.0		
7.5		
8.0		
8.5		
9.0		
9.5		
10.0		

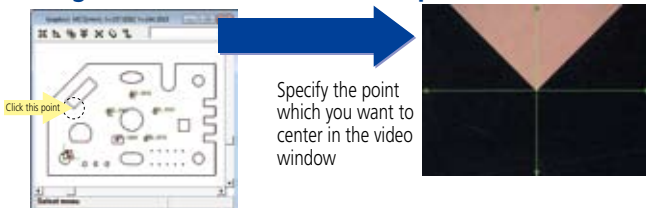
# Navigation Function Contributes to Reduction in Measurement Time

## Stage navigation (QS) ● Patent registered (Japan)

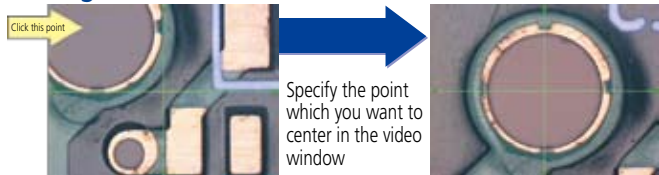
This stage navigation function enables pinpoint positioning when the stage needs to be moved significantly. To move the stage, click the point in the Graphics window to which the stage is to be repositioned. Then, the stage directly moves to the point. This can suppress wasted stage motion such as overrun or inefficient run to the minimum. To accurately move

the stage, click a point to move to the center of the Video window with the mouse. Then, the stage accurately moves to the center of the Video window. The use of this function will significantly reduce the creation time needed for a part program.

### Stage movement with the Graphics window



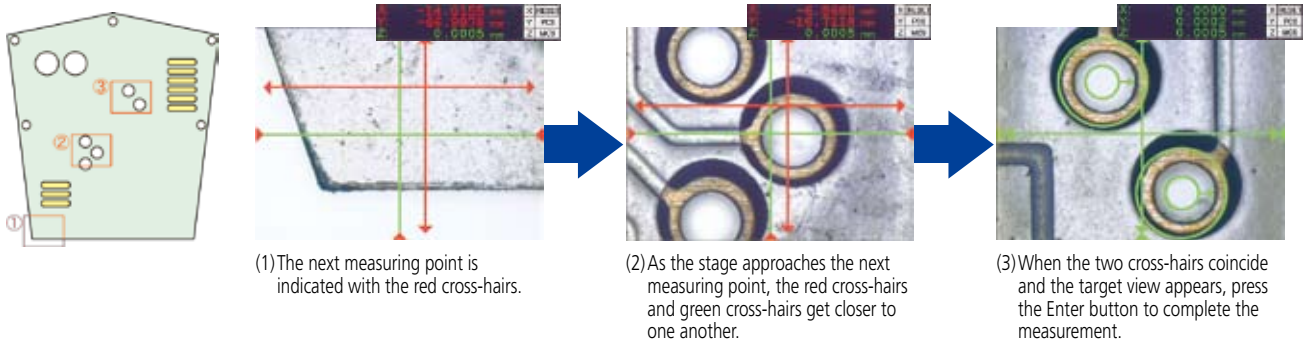
### Stage movement with the Video window



## Quick navigation (QS-L/AFB, QS-LB) ● Patent registered (Japan)

This is a navigation function that concurrently uses the Learn/Repeat function for storing and reproducing a series of measuring procedures. This function navigates the operator to the next measuring point in accordance with the measuring procedure stored. Move the stage until the red cross-hairs indicating the next measuring point coincide with the

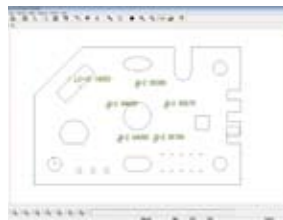
green cross-hairs at the center of the monitor screen. Then, the view at the next measuring point will appear on the screen. This function also allows zero approach using the digital counter. The operator does not need to check a measuring point while looking at a workpiece and can perform measurement while concentrating on the screen.



## Enhanced Capabilities Supporting Tasks from Operator Management to Inspection Report Creation

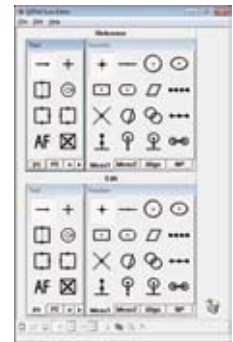
### Graphics window

Measuring features and measurement results are displayed in real time in the Graphics window. This allows the operator to verify measurement points with visual images. Measuring features can also be selected from graphics, thus allowing speedier measurement. Calculation between features is possible using the Graphics window.



### Icon editor

The layout of measurement item icons, tool icons, etc., can be freely rearranged. The operator can apply free icon configuration in which, for example, frequently used icons are grouped on the first page.



### Security function

This function restores the range of use depending on the task level by requesting password entry when QSPAK® starts up.



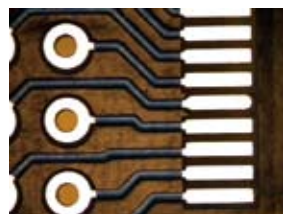
### Video image scale display

Scales in accordance with the actual field of view can be displayed in the Video window to quickly estimate size of a workpiece. If workpiece images are stored along with scale indication, it gives a rough indication of the size of each workpiece.



### Image storage

Color images in the Video window can be output as a file in BMP or JPG format. Also, the images can easily be attached to the record of workpiece graphics, inspection report, etc.



### Measurement report ● Patent pending (Japan)

Measurement results obtained by a part program can be output as they are in CSV format. Since the results are output to commercial spreadsheet software such as Excel, you can create a company specific inspection report.





# Options

## Lineup of Application Software to Meet Advanced Measurement Requirements

### Form assessment and analysis software

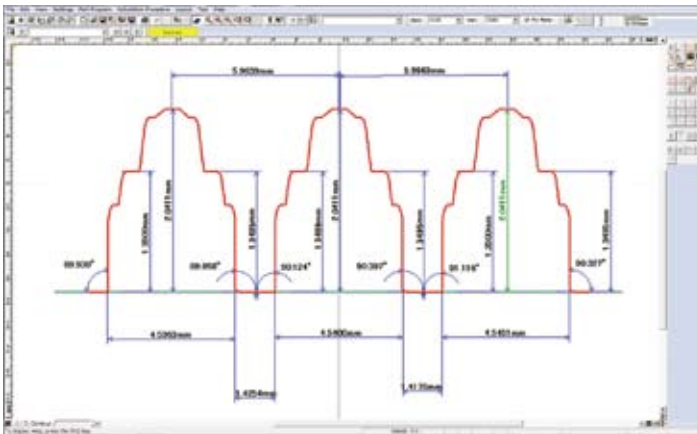
#### ● FORMPAK-QV

This 2D data processing software reads in point group data acquired via tools such as the auto trace tool, performing shape analysis.

\* Auto tracing is performed of areas displayed on the monitor for the QS-L/AFB and QS-LZB.

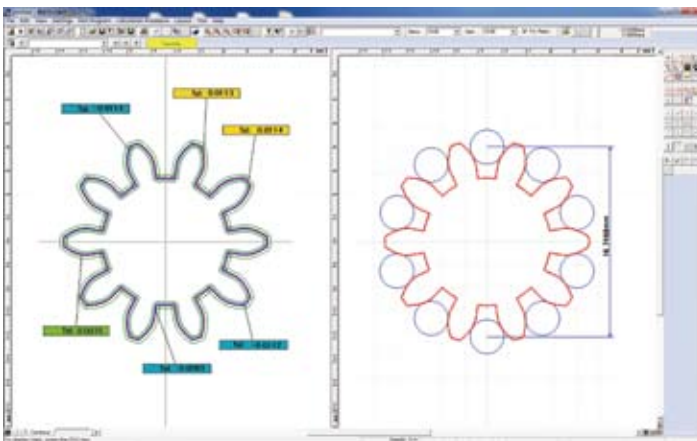
#### ▼ Examples of fine dimension analysis

- The dimensions of fine shapes displayed on-screen can be measured using intuitive controls.



#### ▼ Example of gear contour matching and overpin diameter analysis

- The software can be used to perform contour matching against the design value data.
- You can define virtual circles of any desired diameter.



### Measurement support software

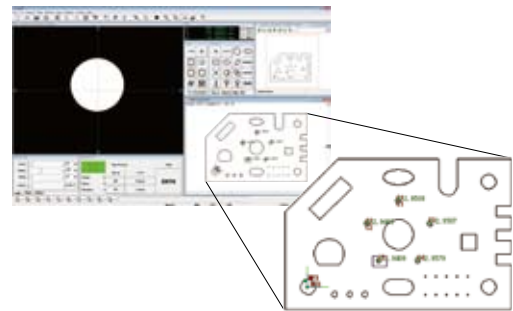
#### ● QS-CAD I/F

CAD data created during the design phase (DXF- or IGES-formatted) can be imported into QSPAK.

QSPAK measurement results can also be converted into CAD data.

#### ▼ Features

- The design value for each measurement item is automatically entered.
- The stage can be quickly moved to a given point in the CAD data.
- Graphic data can be output in a specified CAD format.



### Test chart creation software

#### ● Excel test chart program MeasureReport

This software can be used to summarize Quick Scope measurement results in a test chart.

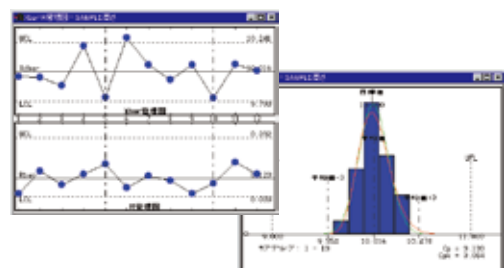
### Process irregularity management software

#### ● MeasurLink

Statistical data can be displayed in real-time, making early detection of process irregularities possible. Data change-points can be analyzed in order to identify problems, and swiftly implement prevention measures when the problems are part of a trend.

#### ▼ Usage examples

- Mold adjustment and replacement timing measures
- Cutting tool adjustment and replacement timing measures, etc.



# Peripherals

## Options compatible with All Devices

### ■ Calibration chart



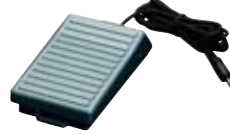
Order No.	<b>02ATN695</b>
Application	Used for CCD pixel size calibration, as well as autofocus accuracy and optic axis offset calibration for individual zoom levels.

### ■ Foot switch - standard type



Order No.	<b>937179T</b>
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### ■ Foot switch - high durability type



Order No.	<b>12AAJ088</b>
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### ■ Dedicated table



Order No.	<b>02ATE760</b>
Exterior dimensions	1800(W)×900(D)×740(H)mm
Mass	60kg

## QS Options

### ■ Control box 2



Order No.	<b>02APW610</b>
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### ■ Joystick box



Order No.	<b>02ATD415</b>
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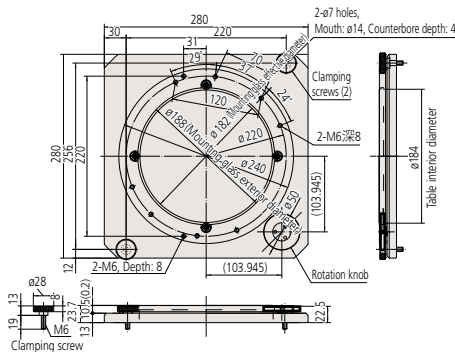
## QS-L/AFB and QS-LZB Options

### ■ Rotary table with fine-feed knob (A)



Order No.	<b>176-305</b>
Exterior dimensions	280(W)×280(D)×24(H)mm ø240mm table top 360 rotation - No angle readout
Mass	5.5kg
Effective glass diameter (mm)	ø182

Note) The V-block with clamp, swivel center support, and holder with clamp can be secured to the top of the table.

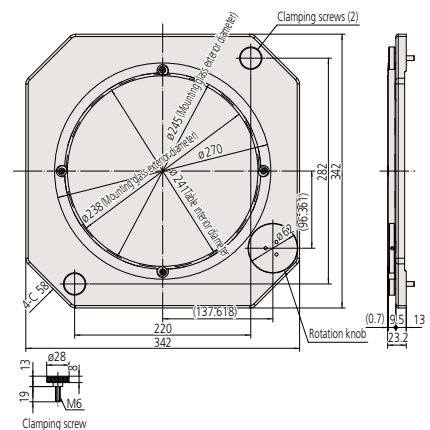


### ■ Rotary table with fine-feed knob (B)



Order No.	<b>176-306</b>
Exterior dimensions	342(W)×342(D)×23(H)mm ø270mm table top 360 rotation - No angle readout
Mass	6.5kg
Effective glass diameter (mm)	ø238

Note) The V-block with clamp, swivel center support, and holder with clamp cannot be secured to the top of the table.



### ■ Holder with clamp



Order No.	<b>176-107</b>
Maximum clamping length	35mm
Exterior dimensions	62(H)×152(W)×38(D)mm
Mass	0.4kg

### ■ V-block with clamp



Order No.	<b>172-378</b>
Maximum supportable diameter	ø25mm
Center height from mounting surface	38-48mm
Exterior dimensions	117(H)×90(W)×45(D)mm
Mass	0.8kg

### ■ Swivel center support



Order No.	<b>172-197</b>
Application	Can be set to tilt of ±10°, in minimum angle increments of 1°. Optimal for measurement of screws, etc. Maximum supportable dimensions: ø80×140mm when horizontal. Maximum supportable dimensions: ø65×140mm when tilted at 10° angle.
Mass	2.5kg

\* Adapter B (176-310) is required for 2010 models separately. Adapter (176-304) is required for 3017 and 4020 models separately.

### ■ Stage adapter Stage adapter B



Order No.	Stage adapter: <b>176-304</b> Stage adapter B: <b>176-310</b>
Exterior dimensions per adapter	50(W)×340(D)×15(H)mm Note) Adapter B is 280mm deep
Mass	Stage adapter: 1.5kg Stage adapter B: 1.2kg
Application	These are used when connecting some optional peripherals to the measurement device.

Note) One set consists of two adapters



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