

Quick Scope

CNC/Manually-operated
Vision Measuring
Microscope

Mitutoyo



Quick Scope Non-contact Vision Measuring
Microscopes Offer High Accuracy, Excellent
Affordability and Powerful Capabilities!

Non-contact Vision Measuring Microscope

Quick Scope

Series 359

Quick Scope has been developed through Mitutoyo's extensive experience and leading-edge technologies in optics and precision measuring. It performs complex, automatic measurements of batches of workpieces or prototype work with more measuring and analysis capability than a profile projector or traditional microscope.

- A color CCD camera provides real-life, sharp workpiece images.
- Available in CNC or manual version, with zoom or fixed magnification.
- Multiple lighting options allow users to customize their Quick Scopes to meet their particular lighting needs.

- Navigation and Graphic functions allow easy operation and movement around the part.
- One-click edge detection.
- Macro icon tools for many common measuring routines.
- Compact and light weight design fits where you need it.
- Powerful, Windows® based software is easy-to-use and intuitive.

Windows is a registered trademark of Microsoft Corporation.

Easy-to-use
Manually-operated System

QS-E



Features/benefits

- Excellent surface observation model for a wide variety of workpieces.
- 0.1 μ m resolution and 150mm (6") Z-axis range.
- Power zoom allows for easy and fast magnification change.
(QS-E1020 is a fixed-magnification type)
- Fine illumination capability allows for lighting changes to match workpiece requirements.
- The quick release system in the stage allows instant switching between a coarse movement and a fine movement.
- Quick Navigation function allows the user to do repeat measurements quickly.

Features

Excellent Performance-cost Ratio CNC System

QS



Estimated times to measure common workpieces with Quick Scope compared to a traditional microscope:

Workpiece	QS (CNC)	Microscope
Lead frame	9 minutes	60 minutes
P.C.B.	6 minutes	60 minutes

Features/benefits

- Surface, contour and fiber-optic ring light illumination options allow users to configure the QS lighting to meet a variety of measurement needs.
- Powerful, Windows® based QSPAK software is easy to use and offers a wide range of measuring and analysis capabilities.
- Functions include zoom, auto-focus, measurement playback, one-click edge detection, graphic display, 48 different macros, and a pattern matching function for several common part features.
- X,Y stage can be controlled by mouse or through the optional multi-function control box.

Model	QS	QS-E
CNC	○	
Auto-focus	○	
Ring light illumination	○	▲
Zoom lens	○	
Control box	▲	
Programmable illumination adjustment	○	
QSPAK	○	○

○: Provided, ▲: Available as option, : Not available

Most Affordable Manually-operated System

QS-E

Features/benefits

- The most affordable Quick Scope model.
- 0.1µm resolution and 6" (150mm) Z-axis range.
- Magnification can be adjusted by changing objectives.
- Excellent observation/measurement for single workpieces.
- The quick release system on the stage allows instant switching between coarse movement and fine movement.
- An optional fiber-optic ring light is available.
- Graphic and Navigation functions allow for quick maneuvering around the workpiece.
- Part programs are easily created in the Windows® based QSPAK software.



Space Saving and Compact Design!

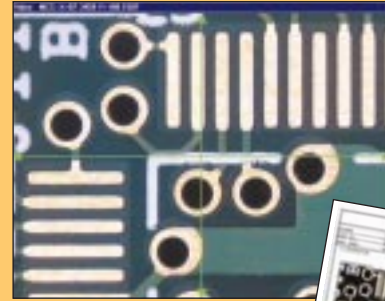
QS SERIES

QS250Z



True color image processing function

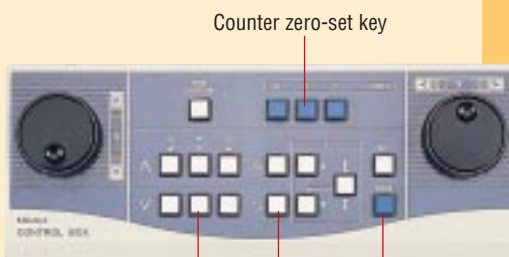
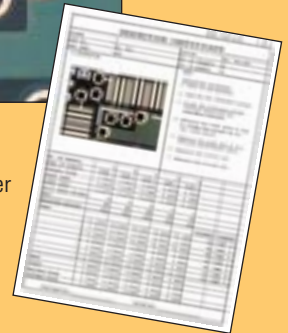
A color CCD camera is used to provide realistic workpiece observation and measurement. The color image can be captured and stored as a bitmap image for other uses and can be printed out.



Built-in control unit for QS

The illumination intensity and zoom lens control unit is built-in to the housing for protection.

Print sample of video printer



Counter zero-set key

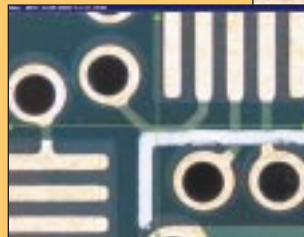
Illumination control key

Data entry key

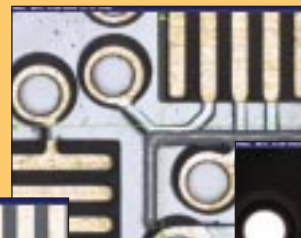
Zoom lens magnification control key

Easy operation with multi-function control box (optional accessory)

Fiber-optic ring light illumination



Surface (coaxial) illumination



Contour (stage) illumination



Fiber-optic ring light provides sharp, clear images of your workpiece (QS and QS-L models)

In addition to surface and contour illumination, the QS and QS-L models of Quick Scope are equipped with a fiber-optic ring light as standard equipment, providing clear color images without shadows.

QSPAK

A unique vision measuring software system that provides powerful measuring capabilities and comprehensive measurement analysis



- QSPAK operates in a Windows® based operating system for easy operation with on-screen dialog.
- All operations can be performed on-screen for maximum operator efficiency: measuring, workstage drive, zoom control, illumination, data processing, and printing.
- Macros include one-click edge detection for fast distance and angle calculation, and circle measurement—just by clicking on the icon and then the feature on the screen.

- Easy X,Y table navigation function provides on-screen instructions for automatic measurement or repeat measurements.
- Template matching and manual pattern matching functions allow for comparison to many common part forms.
- Bit-map image storage capability.

For observation/comparison of a form

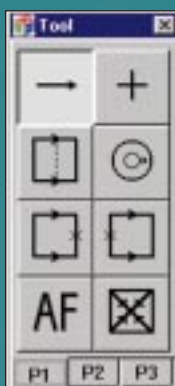
- Template matching function
- Manual pattern matching function

For simple measurement

- One-click edge detection tool function
- Smart tool function
- User macro function

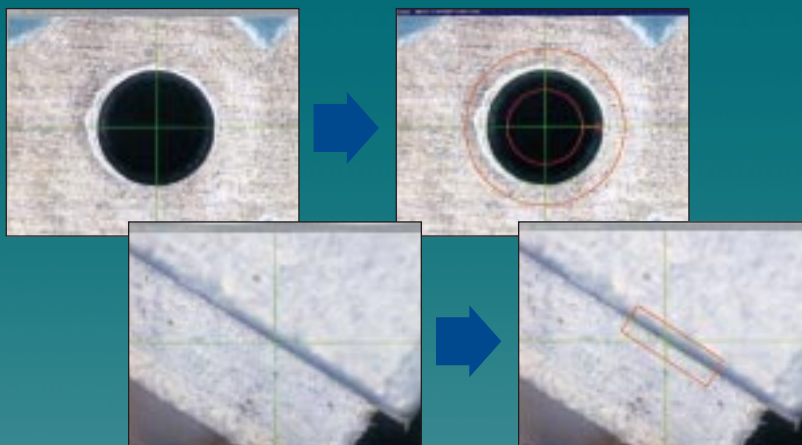
For repeated measurement/ auto-measurement

- Stage navigation function (QS)
- Quick navigation function (QS-E)
- Playback function
- Graphic function
- External data output function
- Statistical calculation function



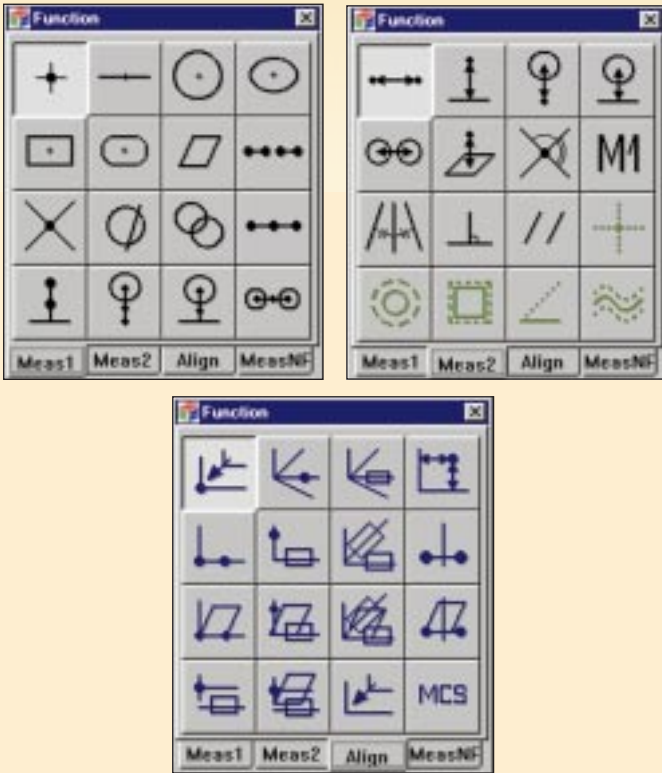
One click edge detection

By clicking the mouse near the edge of a workpiece, QSPak automatically scans the edge and detects it, showing its coordinates. This function also works with the point tool, box tool, circle tool and auto-focus tool.



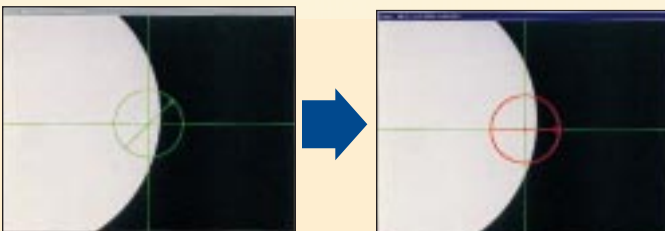
Macro functions

The function window allows easy selection of macro icons for 48 different measurements. Macros are shown on three different pages, easily accessed by tabs located along the bottom edge of the window. Using the macro function, QSPAK automatically selects the appropriate measuring tool to detect workpiece edge and calculate the appropriate feature: diameter, radius, etc.

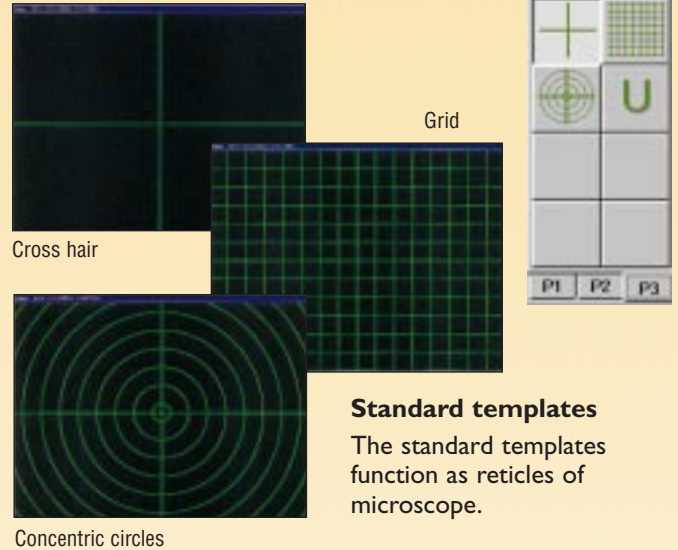


Smart Tool

By moving an image into the central measuring circle, QSPAK automatically scans and detects the clearest edge and centers it in the circle. It's faster and more accurate than using a profile projector or a microscope with cross-hairs.



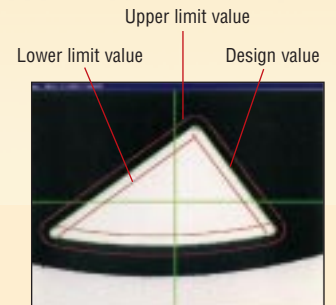
Template Tools



Standard templates
The standard templates function as reticles of microscope.

Manual pattern matching

Different templates can be generated from the master workpiece which are not included in the standard and extended template sections. Upper and lower tolerance levels can be added onto the master workpiece template by entering the tolerance values via the keyboard. This allows the user to customize templates for individual workpieces.



Upper and lower tolerance limits can be added

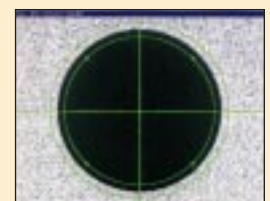
Input the edges by using the manual tool. Join the input points to complete the template.

Extended templates

Four other templates are available as extended template: cross, circle, square and angle. The size of a diameter, a distance, an angle, etc. can be changed just by entering a desired value with the keyboard. It allows simple comparison measurements, only much faster and more accurately than with a profile projector.



Cross



Circle



Square



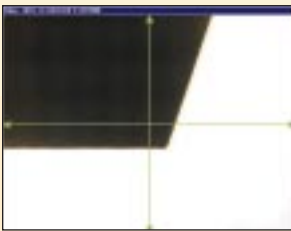
Angle

Stage navigation function (QS CNC model)

The stage navigation function allows X,Y stage movement with the mouse. It speeds measurement and shortens part programming time by reducing stage overrun and short run. For long travel, the user can click on the drawing image in the graphic window; short travel is accomplished by clicking on the video window.

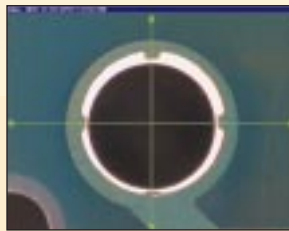
Step feeding is also possible on the QS model. By setting a desired value and clicking an arrow (up, down, right, left) the stage will move according to the entered value. In addition to the machine coordinate system, the stage can be moved using the workpiece coordinate system. The user can measure the workpiece without worrying about its positioning on the table.

Stage control through graphic window

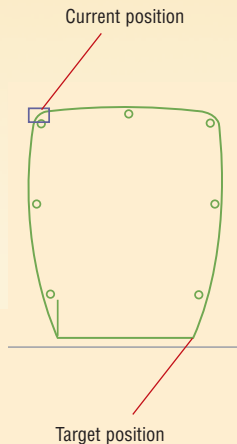


Click the mouse with "Ctrl" key, Quick Scope moves to the position clicked.

Stage control through video window

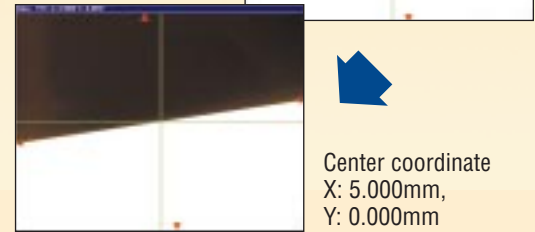
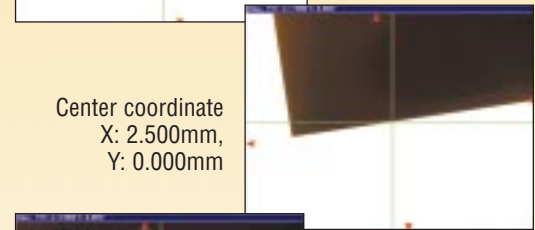
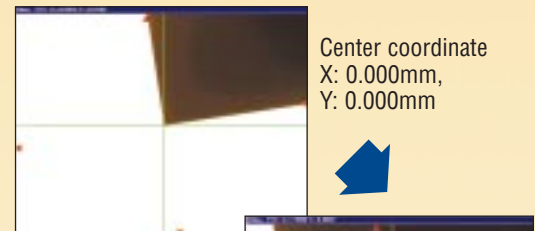


Click the mouse with "Ctrl" key, the clicked point will be centered on the display.



Stage movement in the workpiece coordinate system

In addition to the machine coordinate system, when moving the stage by step feeding, the workpiece coordinate system is available. The stage can be moved along the workpiece coordinate system set.

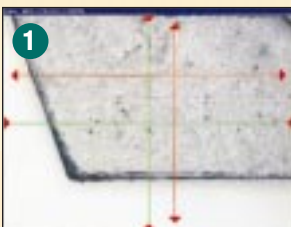


Even though the workpiece is not placed in parallel with the machine coordinate system, after setting the workpiece coordinate system, the stage can be moved along the workpiece coordinate system.

Repeat measurement navigation (QS-E model)

The Quick Scope QS-L can repeat measurement routines (measuring commands, illumination settings, zoom lens magnification, etc.) set in the Learn mode.

The distance from the current position (green cross-hairs at the center) to the next target point (red cross-hairs) are indicated by the counter above the screen. When moving to the next measurement point, all the operator has to do is move the X,Y table until either the counter reads zero or by laying the green cross-hairs on top of the red cross-hairs.



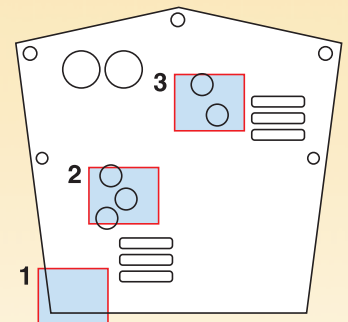
Start repeat-mode.



Move the stage to place the green cross-hairs on top of the red cross-hairs.

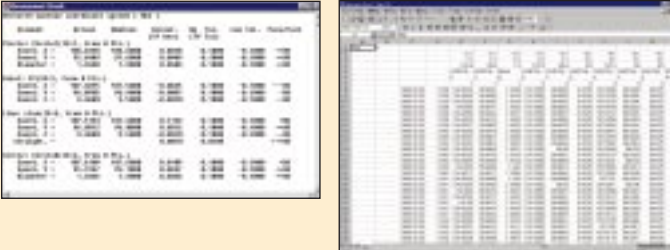


As the green cross-hairs approach the red cross-hairs the next measurement point comes into the screen.



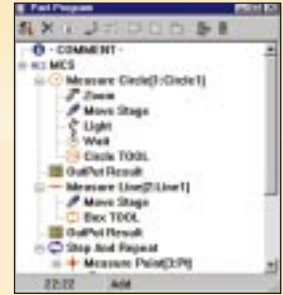
Output of measurement results

The measurement results obtained in the Repeat mode can be output via the CSV format which is compatible with application software such as Microsoft Excel®. QSPAK can help the operator create an inspection chart.



Smart editor function

A series of operation procedures such as moving the X,Y table, changing magnifications, etc., can be displayed as a flow chart for quick reference or teaching new operators measuring routines. This function also allows part programs to be edited by using the edit screen.



Security function

This function limits access to the QSPAK operation by requiring a password for access. This prevents unauthorized users from changing part programs, measuring conditions, etc.

Graphic window

The measurement results and measured elements are plotted in the graphic window in real-time. By using this function the operator can check the current measuring position at a glance. The graphic window can be used for geometrical calculation between features to speed up measurement.

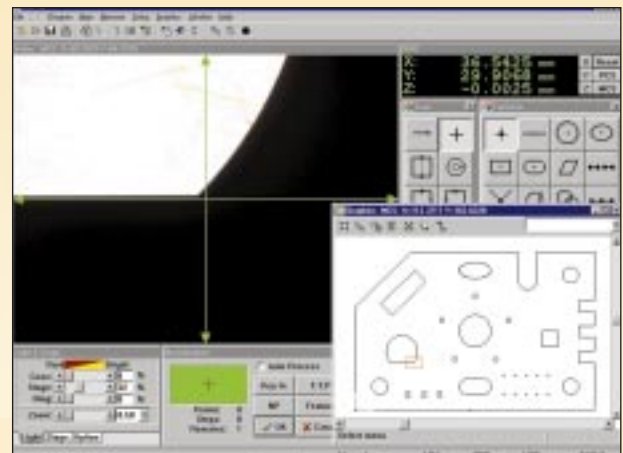


Application software (Optional)

CAD-Import & Export

The CAD-Import & Export program converts the workpiece CAD data (IGES or DXF format) so that it can be brought into QSPAK. This allows part programs to be created in QSPAK directly from the CAD data, saving time and eliminating data entry errors.

- Nominal values for each measurement are automatically converted and imported into QSPAK.
- The X,Y stage can be quickly moved to a position specified in the CAD data.
- Dimensional calculations between elements can be done in the graphic window.



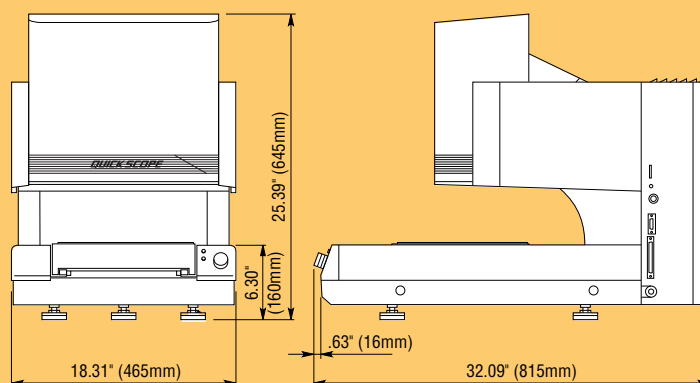
Icon editor function

The layout for the macro icons in the function window and the tool icons in the tool window can be easily changed for increased efficiency.



Dimensions/Specifications

QS200Z (Zoom type)
QS250Z (Zoom type)
QS200 (Fixed-magnification type)
QS250 (Fixed-magnification type)



Specifications

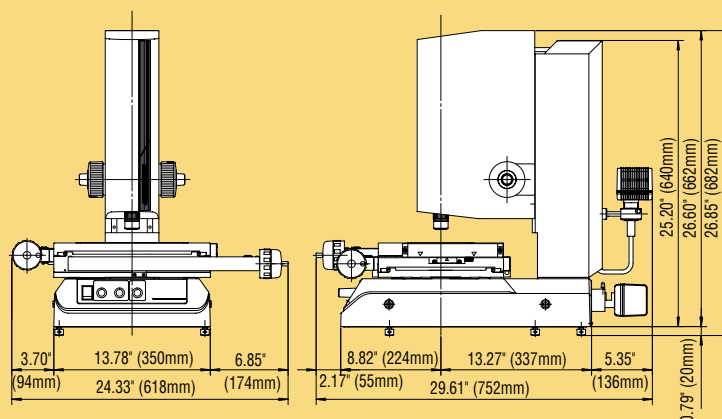
Model	QS200Z QS200	QS250Z QS250	
Range	<i>X-axis</i>	8" (200mm)	8" (200mm)
	<i>Y-axis</i>	8" (200mm)	10" (250mm)
	<i>Z-axis</i>	4" (100mm)	4" (100mm)
Resolution	0.0005mm		
Length standard	Reflective linear encoder		
Measuring accuracy (at 20 C)	(3+10L/1000) μm		
Machine operation	CNC/manual (motor-driven) Maximum drive speed: 50mm/s Maximum acceleration: 250mm/s ²		
Auto-focus function	Provided as standard		
Magnification on 17" monitor (Select either the power-zoom lens type or the fixed-magnification type.)	QS200Z/250Z: 21X - 147X (8-step zoom) QS200/250: 42X / 105X / 210X when using 1X objective (02ALA400) when using 2.5X objective (02ALA410) when using 5X objective (02ALA420)		
Image detecting unit	High-resolution 1/3" color CCD camera		
Illuminations	<i>Surface</i>	Co-axial light, fiber-optic ring light	
	<i>Contour</i>	Stage light	
Table glass size	10.59" x 10.28" (269 x 261mm)	10.59" x 12.24" (269 x 311mm)	
Maximum workpiece height	4.33" (110mm)		
Maximum workpiece weight	22 lbs. (10kg)		
Power supply	100V - 240V AC		
Power consumption	1300VA at max.		
Dimensions (W x D x H)	<i>Main unit</i>	18.31" x 32.09" x 25.39" (465 x 815 x 645mm)	
	<i>Power unit</i>		
Mass	<i>Main unit</i>	165 lbs. (75kg)	
	<i>Power unit</i>		

*When using 2.5X objective or the zoom lens in 2.5X magnification (Magnification on monitor: 105X),
L= Measuring length (mm)

Zoom Lens Specifications for QS200Z, and QS250Z

Lens magnification (8-step)	0.5X	0.65X	0.85X	1X	1.5X	2X	2.5X	3.5X
Magnification on monitor	21X	27X	36X	42X	63X	84X	105X	147X
View fields	.378" x .283" (9.6 x 7.2mm)	.294" x .22" (7.47 x 5.6mm.)	.22" x .165" (5.6 x 4.2mm)	.189" x .142" (4.8 x 3.6mm)	.126" x .094" (3.2 x 2.4mm)	.094" x .071" (2.4 x 1.8mm)	.076" x .057" (1.92 x 1.44mm)	.055" x .039" (1.4 x 1mm)
Working distance	2.17" (55mm)							

QS-E1020



Specifications

Model	QS-E1020	
Range	<i>X-axis</i>	8" (200mm)
	<i>Y-axis</i>	4" (100mm)
	<i>Z-axis</i>	6" (150mm)
Resolution	0.0001mm	
Length standard	Reflective linear encoder	
Measuring accuracy (at 20 C)	(3+20L/1000) m	
Machine operation	Manual	
Auto-focus function	Not available	
Magnification on 17" monitor	42X / 105X / 210X when using 1X objective (02ALA400) when using 2.5X objective (02ALA410) when using 5X objective (02ALA420)	
Image detecting unit	High-resolution 1/3" color CCD camera	
Illuminations	<i>Surface</i>	Co-axial light
	<i>Contour</i>	Stage light
Table glass size	9.44" x 5.51" (240 x 140mm)	
Maximum workpiece height	5.50" (150mm)	
Maximum workpiece weight	22 lbs. (10kg)	
Power supply	100-120V/220-240V AC 10%	
Power consumption	160VA at max.	
Dimensions (W x D x H)	24.33" x 29.60" x 26.85" (618 x 752 x 682mm)	
Mass	126 lbs. (57kg)	

Optional Accessories

- 960945 Machine table
- 02AKN020 Calibration glass chart
- 02ALA400 Objective 1X*
- 02ALA410 Objective 2.5X*
- 02ALA420 Objective 5X*



Order No.	02ALA400	02ALA410	02ALA420
Magnification	1X	2.5X	5.0X
Magnification on monitor	42X	105X	210X
View field	4.8 x 3.6mm	1.92 x 1.44mm	0.96 x 0.72mm
Working distance	34mm	34mm	33.5mm

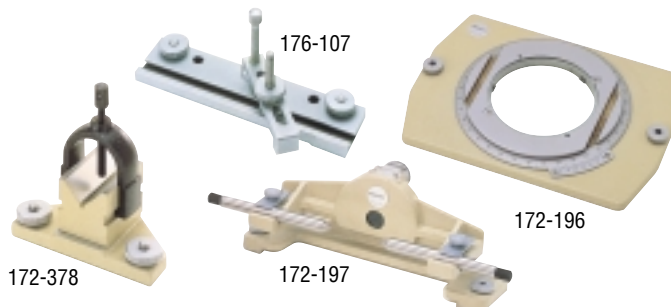
*Can not be used for the power zoom type Quick Scope.

- 02APA900 Control box for QS CNC
- 960707 Joystick box for QS CNC
- 937179T Foot switch
- 12AAA645 Color filter (GIF) for QS-E
- 12AAA646 Color filter (LB80) for QS-E
- 12AAA643 Color filter (ND2) for QS-E
- 12AAA644 Color filter (ND8) for QS-E
- 359-643 Fiber-optic ring light unit for QS-E

(Suffix code according to AC line voltage: C for 110V AC, A for 120V AC, D for 120V AC, E for 240V AC, no suffix for 100V AC)

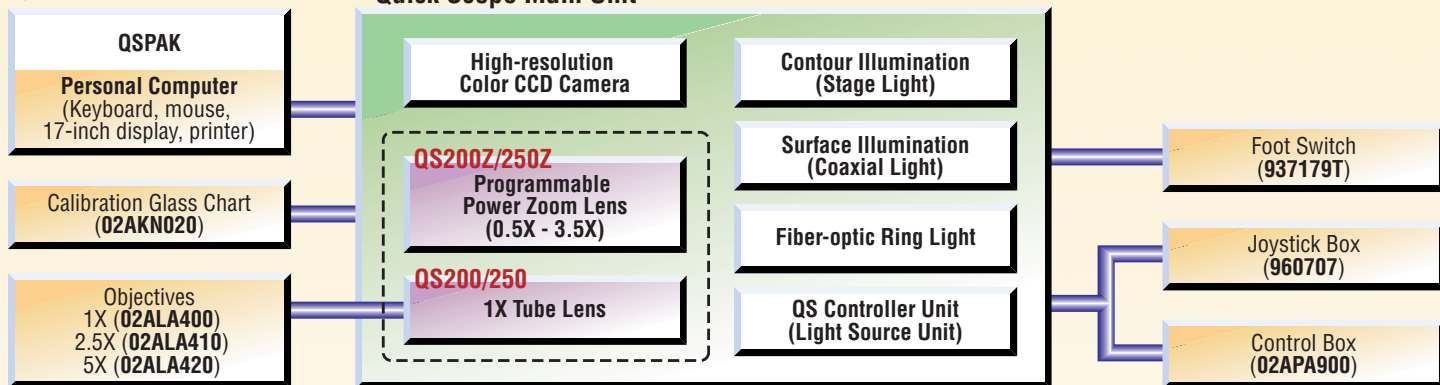
- 172-289 Rotary table 200mm
- 999678 T-groove mount adapter
- 172-197 Swivel center support**
- 172-196 Rotary table 100mm**
- 176-107 Holder with clamp**
- 172-378 V-block**

**Can be used with T-groove mount adapter (999678) for QS-E.

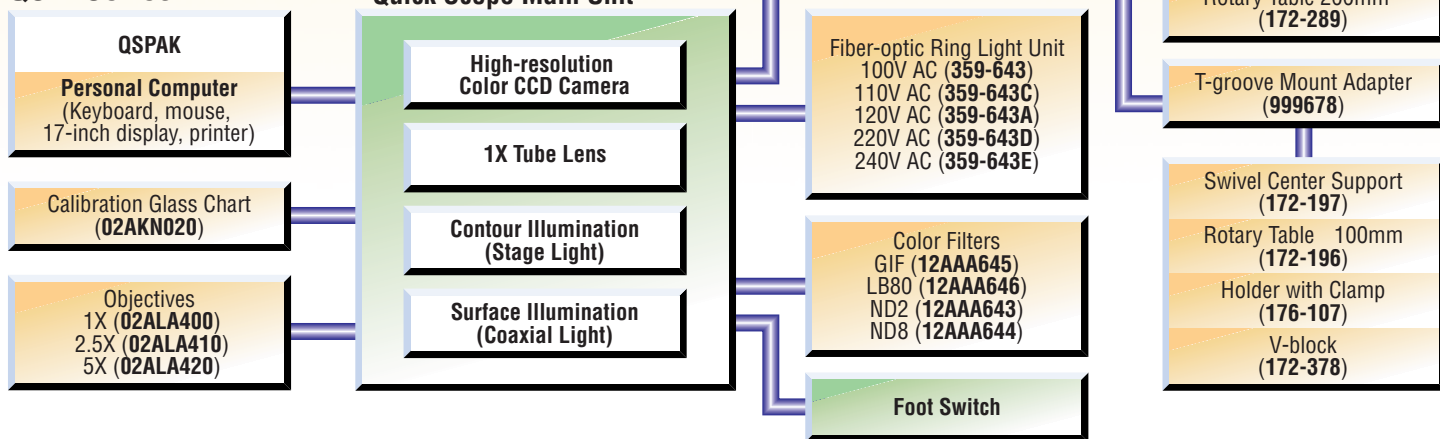


System Diagram

QS CNC Series



QS-E Series



- : Standard accessory
- : Optional accessory
- : Select either when ordering



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