

DIGITAL MEASURING MICROSCOPE

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USER MANUAL

Thank you for purchasing the DIGITAL MEASURING MICROSCOPE. Please read this manual thoroughly before use, and keep available for future reference in order to insure proper operation and a long service life.

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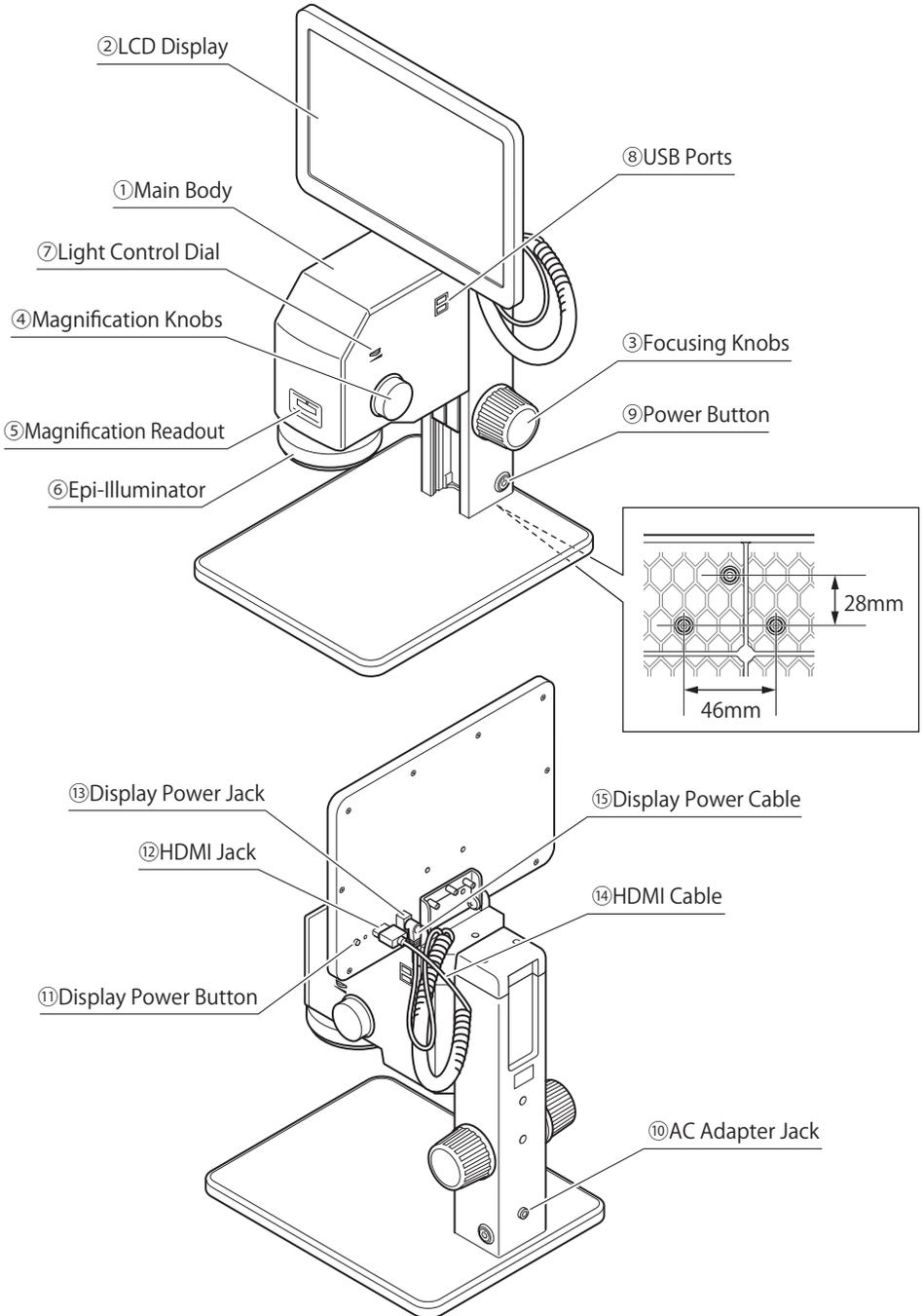
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©After reading this manual, please keep it readily accessible for future reference.

PART IDENTIFICATION

Names of major components



■ Part Name and Function

	N A M E	F U N C T I O N
①	Main Body	Main Body of the instrument.
②	LCD Display	Displays the object being inspected.
③	Focusing Knobs ※	Adjusts focus by controlling height of Main Body.
④	Magnification Knobs	Controls magnification level.
⑤	Magnification Readout	Displays the magnification level set by (④) Magnification Knobs.
⑥	Epi-Illuminator	LED light for top surface illumination.
⑦	Light Control Dial	Stepless control of (⑥) Epi-Illuminator power.
⑧	USB Ports	2x USB ports for connecting input mouse, keyboard, USB memory, etc.
⑨	Power Button	Main Body power ON/OFF control.
⑩	AC Adapter Jack	AC Adapter Jack.
⑪	Display Power Button	Turns LCD Display ON/OFF.
⑫	HDMI Jack	HDMI input for Display.
⑬	Display Power Jack	Power input for Display.
⑭	HDMI Cable	Video signal output cable.
⑮	Display Power Cable	Power supply cable for LCD Display.

※Focusing Knob stiffness adjustment:

If the Focusing Knobs are too stiff or too loose, their tension can be adjusted by holding one knob while turning the other.

Turn clockwise to make the knobs stiffer, and turn counterclockwise to loosen.

SAFETY PRECAUTIONS

Please Observe

To avoid accident or unsafe conditions read this manual thoroughly and follow the directions. In this manual, safety information is labeled as either a 「⚠ WARNING」 or a 「⚠ CAUTION」

WARNING

This notice indicates a hazardous situation that, if not avoided, could result in **death** or **serious injury**.

CAUTION

This notice indicates a hazardous situation that, if not avoided, could result in injury to the user or property damage.

Please note that **items marked with 「⚠ CAUTION」 also contain important safety information which may have serious consequences if not followed.**

All safety precautions should be observed at all times.

WARNING

1. **To prevent electrical shock, turn the Power Button OFF and unplug the AC Adapter before installing or removing lights or cables, or when cleaning the equipment.**
2. **To avoid injury, keep hands and fingers away from moving parts and pinch points when operating the equipment.**
3. **Only use with the provided AC Adapter.**
4. **Handle the cables with care and do not twist or bend at sharp angles. Damage to cables may create risk of shock.**
5. **If there is any smoke, unusual odor, or abnormality with the equipment, turn power OFF immediately.**

 **CAUTION**

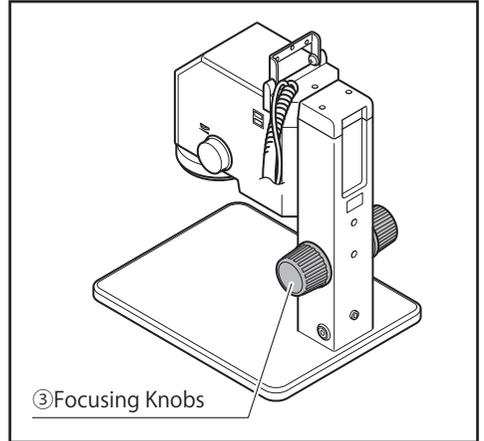
1. Handle with care. This is a precision instrument, do not subject to shock or excessive forces during operation or transport.
2. Use and store instrument in proper conditions. Keep instrument away from direct sunlight, environments with high dust or vibrations, or subject to extreme temperatures or high humidity.
3. Use care to keep lens surface free from fingerprints and dirt.
4. Clean the lens only with suitable lens cloth, cotton swab or cotton gauze.
5. To prevent mold and corrosion, when not in use cover the instrument with the protective cover and store in a dry environment.
6. Use care when loosening the tension on the Focusing Knobs. If loosened too much the Main Body of instrument may fall.
7. To prevent malfunction, do not toggle the Power Button repeatedly or aggressively.
8. Product contains metal bearing surfaces and repeated motion may generate particle contaminates. It is not suitable for use in a clean-room. If there is possibility that metal particles will damage the device being inspected, use care to keep the device from under the instrument when parts are being moved, or discontinue use.
9. Use care when connecting the wires; if improperly assembled they may get caught on moving parts and be damaged.
10. Do not disassemble or modify product, it may result in damage.

SET-UP

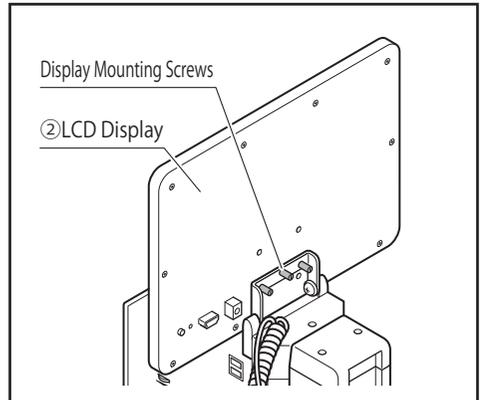
■ Before Initial Use

● Assembly

1. Raise the Main Body to the maximum height by turning the Focusing Knobs.

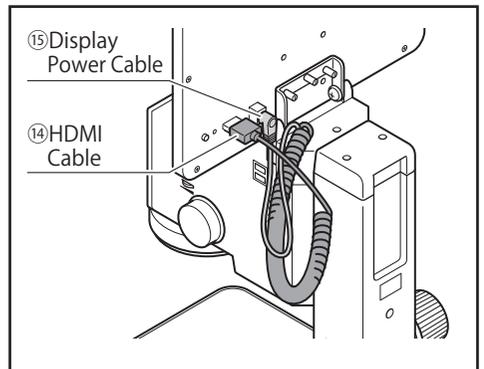


2. Mount the Display securely to the Main Body using the 3 Display Mounting Screws (included.)



3. Connect the HDMI Cable and Display Power Cable as shown in the diagram.

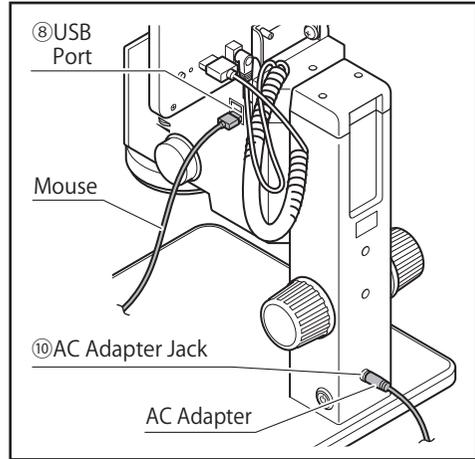
※ Instrument can also be used with any commercial display that accepts HDMI input.



4. Connect the mouse to the USB Port and the AC Adapter to the AC Adapter Jack.

⚠ CAUTION

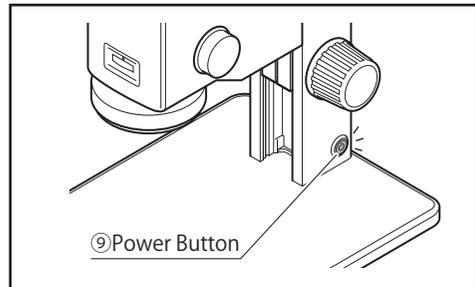
- Instrument must be placed on stable horizontal surface.
- The operating conditions of this equipment, when used in combination or proximity to other equipment, may affect performance.
- This is a precision instrument, use care to avoid excessive vibration or shock.



■ Before Each Use

● Start-up

1. Press the Power Button to turn the system ON. The Power Button will light, and the Display will also be powered up.
2. The Start Up Screen will display and then switch to the Image / Measurement Screen.



● Display

Display power is turned on when the Main Unit is switched ON.

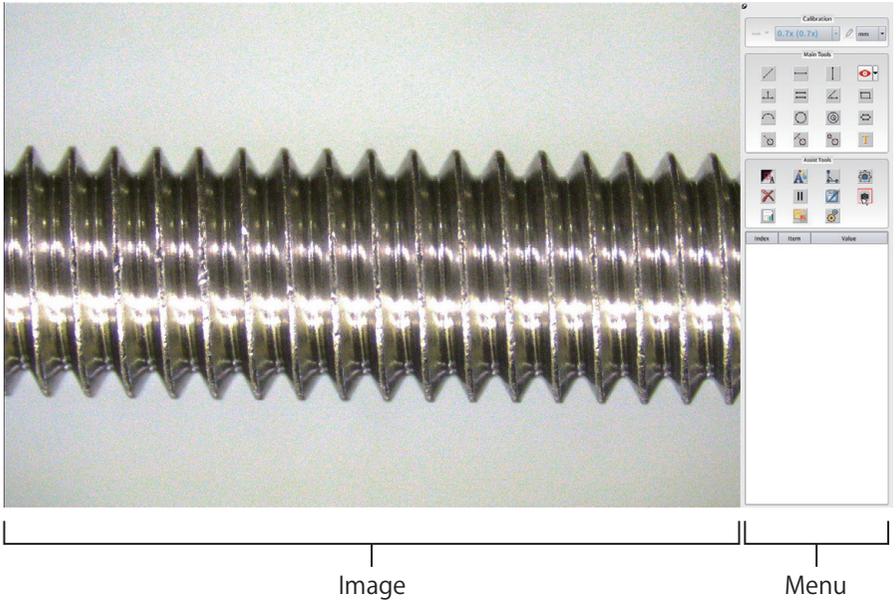
※The Display can be turned OFF independently by pressing the Display Power Button.

● USB Port

- Connect the provided mouse to control the system.
- A commercially available USB memory stick can be used to save captured images and data.
- Text can also be input using a commercially available USB keyboard.

HOW TO USE

Basic Operation



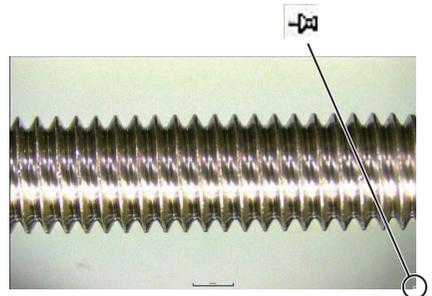
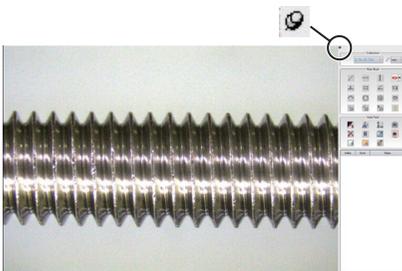
● Image Display

Real time display of the object being examined.

● Menu

For selecting the assorted tools.

To show/hide the Menu, click on the Pin Icon, or double-click the right mouse button in the Image area of the display.



● Mouse Operation

Left Click : Select item.

Left Double-Click : When entering text, double clicking on the input entry area will bring up a virtual keyboard.

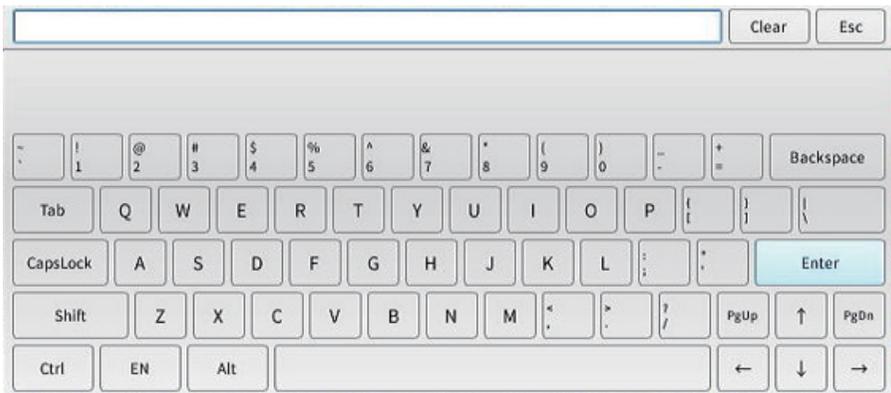
Right Click : Cancels any active measurement tools and brings up the context menu.

Right Double-Click : Cancels the selected measurement tool.

Double click on the Image display will show/hide the menu if there is no measurement tool active.

● Virtual Keyboard

Double click left mouse button in text input area to bring up the virtual keyboard.



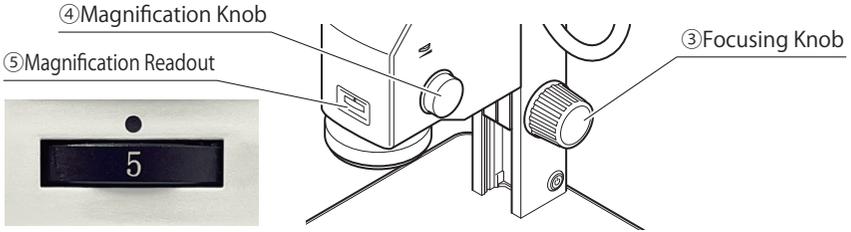
- Press 「Enter」 to input the entered text.
- Press 「Esc」 to abort entry and close the virtual keyboard.
- Symbols can be entered by pressing 「Shift」 and a number key.

HOW TO USE

Basic Image / Measurement

Example of measuring length on an image.

1. Position the object to be measured.
Set the magnification level to 「5」 by turning the Magnification Knob.
Turn the Focusing Knob until the object is in focus.



- ※When turning the Magnification Knobs, be sure to stop at a "click" or detent.
When magnification is set correctly the magnification reading will be centered in the readout.
- ※Improper focus will affect measurement accuracy.

2. While observing the subject, adjust the magnification to the desired value for best results. Next, set the value in the software to match the magnification of the instrument. In the Calibration Menu, select the saved registered magnification value to match the magnification of the instrument.



- ※If the magnification setting in the software does not match the magnification set on the instrument, the measurement will not be correct.
- ※If necessary, readjust the Focusing Knobs to make sure the object is in focus.
- ※Accurate measurements depend on correct focus.
At low magnification the instrument has a wide focus range and measurements are more sensitive to proper focus. Use a commercially available reference standard to check the equipment and confirm accuracy of focus.

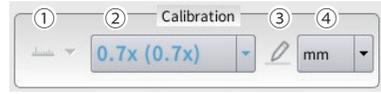
3. Select the Length Icon from the Measurement Tools Menu. 
- ※For other tools, please refer to Page 12 of this document.

4. Select the first measurement point. A measurement line and intermediate value will display.
5. Select the second measurement point. When the second point is confirmed the measurement line and value will be displayed and recorded to the measurement history. This completes the measurement.

■ Calibration Tools

Setting / Configuring the software magnification and units settings.

①	Calibration value (magnification) registration. ※ Switch to "admin" (administrator) account to select this item.
②	Set the magnification level.
③	Calibration value list. ※ Switch to "admin" (administrator) account to select this item.
④	Set the units from the following options: Pixel, mm, μm



■ Calibration Value Registration / Management

Software calibration values (magnification settings) can be created and deleted.

⚠ CAUTION

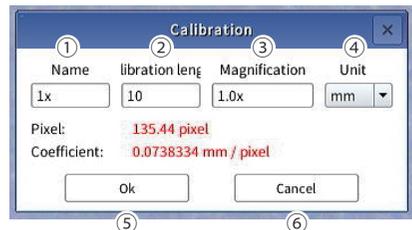
The factory preset calibration values can not be restored if they are deleted.

Depending on your operating situation, newly created calibration values may not provide satisfactory measurement results. Please proceed at your own risk with appropriate caution and understanding.

● Calibration Value Registration

1. Switch the "admin" user account in system settings. ※See P18
2. Prepare a reference standard with sufficient accuracy, such as a commercially available glass calibration slide, and adjust the focus following the procedure in "Basic Image / Measurement."
3. Adjust the calibration value to the desired magnification and then select the calibration value registration button.
Using the 「▼」 Button, you can select registration based on memory or circle.
4. After selecting method for registering the calibration value, double-click the right mouse button to display the calibration window.
5. Enter values for items ① to ④ listed below and press 「Ok」 to register the calibration value.

①	Enter name for the Calibration Value. ※ Must be new name not already registered.
②	Enter the length of the selected mark or the diameter of the circle.
③	Enter the magnification set on the instrument.
④	Select the units of measurement.
⑤	Register with above information.
⑥	Exit without registering.



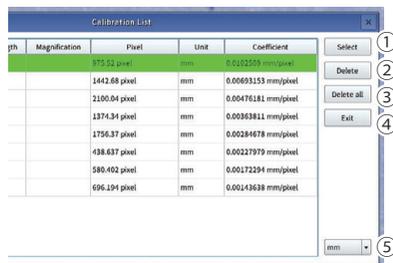
HOW TO USE

● Calibration Value Management

1. Switch to "admin" account in system settings ※Ref. P18
2. Click on the Calibration List menu to display the list of registered calibration values.
3. Use the following controls to manage the calibration values.

①	Selects highlighted row as the current magnification setting.
②	Deletes the calibration value in the selected row. ※
③	Deletes all the calibration values. ※
④	Exit and close the Calibration List management screen.
⑤	Change current units setting.

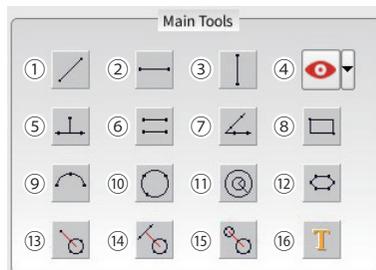
※Please use caution, deleted calibration values can not be restored.



■ Measurement Tools

For various measurements, text input, and adding target line ON / OFF.

①	Measure distance from point to point.
②	Measure horizontal distance between two points.
③	Measure vertical distance between two points.
④	Toggle the Target Line ON/OFF. Click 「▼」 for option to display memory lines on the target.
⑤	Measure the perpendicular distance to a line.
⑥	Measure the distance between two parallel lines.
⑦	Measure an angle.
⑧	Draw a rectangle and measure.
⑨	Measure an arc.
⑩	Measure a circle.
⑪	Measure concentric circles.
⑫	Draw a polygon and measure. ※Right click after each point to confirm.
⑬	Measure from a point to the center of a circle.
⑭	Measure from a line to the center of a circle.
⑮	Measure distance between the centers of two circles.
⑯	Text input ※Double-click the left mouse button inside a text entry box to bring up a virtual keyboard.



Assist Tools

Tools for data recording.

①	Toggle automatic end face detection ON/OFF when using measuring tools.
②	Open the graphics settings window.
③	Open the output settings window.
④	Open the camera settings window.
⑤	Clear the data on the Image Screen. ※The data history will not be deleted.
⑥	Pause, or freeze the Image Screen. Click again to resume real time viewing.
⑦	Save Data History to USB drive in .CSV format. ※USB memory stick must be installed.
⑧	Capture screen image and save to USB Drive. ※USB memory stick must be installed.
⑨	Save graphics data.
⑩	View Folders.
⑪	Open the system settings window.



History

Displays the results of measurements made using the measurement tools.

①	Sequential list of measurement data in order in which they are recorded.
②	Icon showing the type of measurement made.
③	The measurement result.

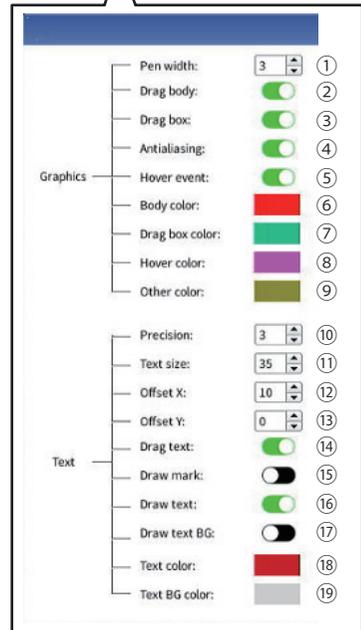
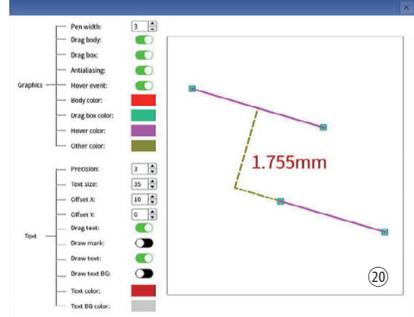
①	②	③
Index	Item	Value

Place cursor on data item in list and right-click to delete that item, or to delete all items.

■ Graphics Settings

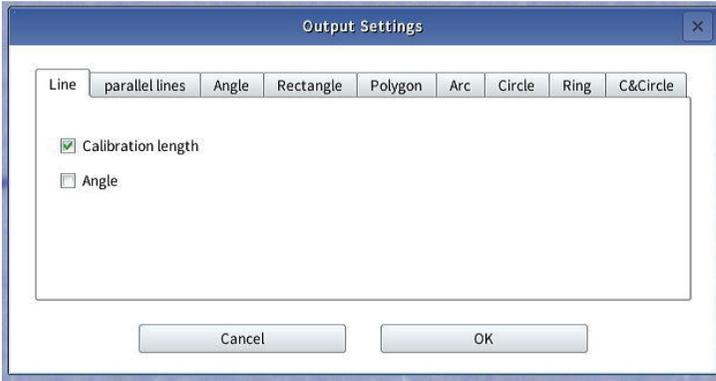
Control how the measurement results are displayed and positioned on the image. Allows user to set parameters such as line thickness and text color, as well as ability to drag the measurement results.

①	Line thickness.
②	Turn ON to drag whole measurement element.
③	Turn ON to drag the measurement line.
④	Turns anti-aliasing ON/OFF.
⑤	Turn ON for measurement line color to change when confirmed.
⑥	Select Measurement Line color.
⑦	Select color of the drag box.
⑧	Select color of line before it is confirmed.
⑨	Select Auxiliary lines color.
⑩	Number of characters to Left of decimal to display.
⑪	Text font size.
⑫	X-offset for display of measurement text.
⑬	Y-offset for display of measurement text.
⑭	Turn ON to drag measurements text.
⑮	Turn ON to display measurement icon.
⑯	Turn on to edit text.
⑰	Turn on to display background for text.
⑱	Select text color.
⑳	Shows preview of graphics options selected.



Output Settings

Control the output for each parameter.



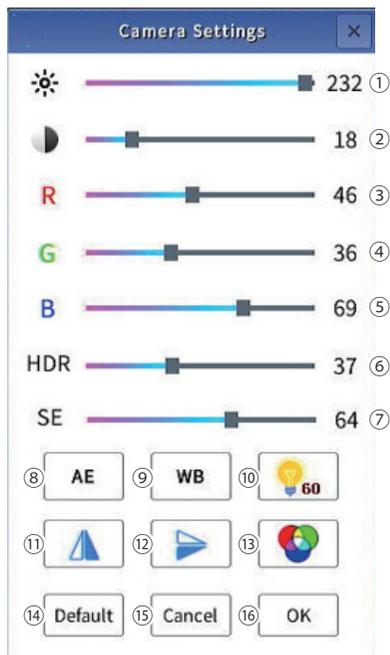
TAB	MEASUREMENT TOOLS	OUTPUT OPTIONS
Line		Calibration Length, Angle
Parallel lines		Midline
Angle		Auxiliary angle (Supplementary Angle), Bisector
Rectangle		Width, Height, Perimeter, Area,
Polygon		Perimeter, Area
Arc		Radius, Diameter, Arc length (Arc) Angle, Center of circle
Circle		Radius, Diameter, Perimeter Area, Center of circle
Ring (Concentric)		Radius1, Radius2, Radius Difference Area Difference, Center of circle
C & Circle (Circle to Circle)		Distance, X Difference, Y Difference

■ Camera Settings

Control the camera settings such as brightness and Image Screen color settings.

※This is a setting for the Image Screen and does not change the saved image data.

①	Brightness
②	Contrast
③	Red tint
④	Green tint
⑤	Blue tint
⑥	High Dynamic Range control
⑦	Sharpness
⑧	Automatic Brightness Adjustment
⑨	Automatic White Balance Adjustment
⑩	Frame Rate. Click to sequence through options: 25 fps → 30 fps → 50 fps → 60 fps
⑪	Flip image horizontally
⑫	Flip image vertically
⑬	Switch between color and monochrome display.
⑭	Restore default settings.
⑮	Close the window without saving changes.
⑯	Save changes and close the window.

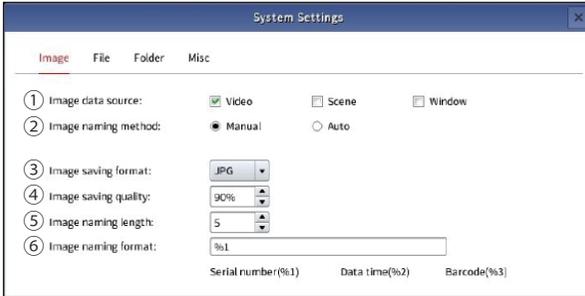


System Settings

Settings used for data storage and to turn various features ON/OFF.

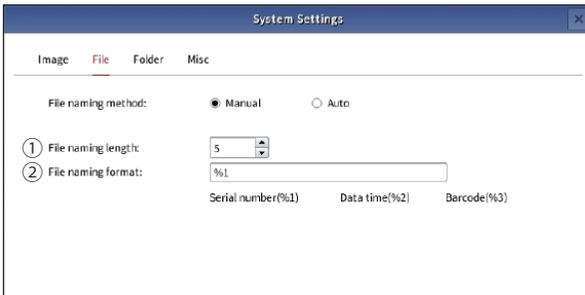
Upper section

Image tab: Control how images are captured and saved.



①	Select what to include in captured image. Video··Object under inspection, Scene··Measurement tool drawing, Window··Menu window
②	Select manual or automatic naming for image file.
③	Image Format (JPG, BMP, PNG)
④	Image quality setting.
⑤	Serial No. Length for automatic file naming.
⑥	Format code for file naming: Use format codes to enter the following information: %1··Serial No.、 %2··System time. Ex: For Serial No. Length (⑤) set to 「3」, and the format code entered is 「data %1」: The files will be named sequentially 「data 001」, 「data 002」, 「data 003」, ...

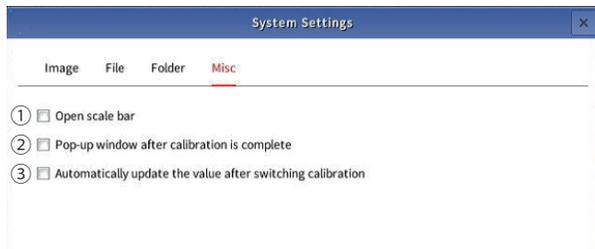
File tab: Control how CSV data and graphical data are saved.



①	Serial No. Length for file naming.
②	Format code for file naming: %1··Serial No. %2··System time.

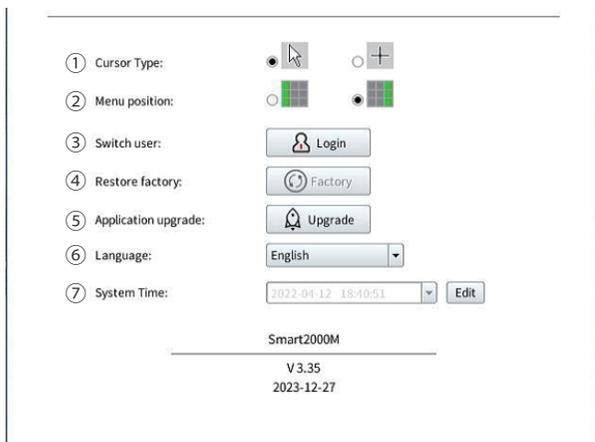
※Folder Tab settings are similar to the above.

Misc Tab



①	Select to display a scale bar at bottom of screen.
②	Select for automatic pop-up of calibration setting window after calibration function is complete.
③	If selected, historical data values will be updated to current mag. when calibration value is changed. ※ All historical data will be updated to reflect the current magnification setting. Use with caution. If instrument magnification is changed, updating the calibration value will make the recorded data incorrect.

● Lower Section



①	Specify cursor type.
②	Specify menu position.
③	User Account management.
④	This will reset the system to its factory default state. ※ Switch to "admin" (administrator) account to select this item. ※ In addition to the other settings, registered calibration values (magnification data) will also be erased. Use of this function is not recommended.
⑤	Upgrade software.
⑥	Select the language used on the Display.
⑦	Set the system time.

■ Care and Storage After Use

After using, be sure to turn system OFF by pressing the Power Button on the Main Body. Protect from corrosion and mold-growth by storing in protective cover in location with low humidity.

TROUBLESHOOTING

※Please refer to P2~P3 for Part ID and Function.

●Use the following chart to identify problems you may be having and find corrections.

PROBLEM	CAUSES	SOLUTION
Restart required	①Unstable immediately after start-up or when at cold temperatures.	①When first turned on, please allow the unit to warm up before use.
	②Operation is unstable when processing excessive data.	②Be careful not to overload the unit with excessive data.
No power	①Problem with input power.	①Please check the power to the AC Adapter and connection to Main Unit.
		②Check that Power Button Lights. If power is properly connected, the Power Button will light when the system is turned ON.
	③Monitor is not connected properly.	③Please check that the power cable and HDMI cable are properly connected to the monitor.
Software does not respond	①Mouse not connected.	①Make sure the mouse is properly connected to the USB port.

※If problem persists, or if you have any questions, please contact distributor or place of purchase. Please note, manufacturer is unable to respond to inquires or provide service directly. Please contact distributor or place of purchase.

■ SPECIFICATIONS

● Basic Specifications

※For magnification = 1x, ϕ 7mm central portion of image.

Model No.	MMS-1498	Max Sample Height	~60mm
Total Magnification	14x ~ 98x	Focus Method	Main unit vertical movement
Eye piece	0.4x	Standard	Rack & Pinion
Objective	0.7x 1x 1.5x 2x 2.5x 3x 4x 5x	Illumination	(144x) white LED
Meas. Accuracy	$\pm 0.05\text{mm}$ ※	Interface	(2x) USB 2.0
Image Sensor	1/3 CMOS	Power	AC100-240V 50/60Hz (AC Adapter incl.)
No. of Pixels	200 megapixel		
Frame Rate	25fps ~ 60fps	Base	L320 × W260 × H20mm
Working Distance	100mm	Weight	~4.4kg
Support adj. Range	100mm	Accessories	AC Adapter, Mouse, Protective Cover

● Field of View

Units: mm

Magnification	0.7x	1x	1.5x	2x	2.5x	3x	4x	5x
Menu on	16.7×11.2	11.2×7.6	7.7×5.2	5.9×4.0	4.6×3.1	3.7×2.5	2.7×1.9	2.3×1.5
Menu hidden	20.2×11.2	13.6×7.6	9.4×5.2	7.1×4.0	5.6×3.1	4.5×2.5	3.3×1.9	2.8×1.5

WARRANTY

If product breaks during the warranty period and has been used in accordance with this manual and for normal usage, please present this document to the store where purchased to request repairs.

Product Name	DIGITAL MEASURING MICROSCOPE	Date of Purchase※	(y)___ (m) ___ (d) ___
Model No.	MMS-1498	WARRANTY PERIOD	1 YEAR
PURCHASER ※	Address 〒	RETAILER ※	Address Store Name Tel. No.
	Name 様		
	Tel. No. - () -		

※All marked fields must be filled in for application to be valid.

1. During warranty period, repair fees will still apply for the following conditions:

- ① This document is not presented with product for repair.
- ② The purchase date, customer name, or retailer name is not written on this document, or if the text has been altered.
- ③ Damage or failure caused by improper use, repair, or modification of the product.
- ④ Damage or failure caused in transport, by dropping, or improper handling after purchase.
- ⑤ 火 Damage or failure caused by fire, earthquake, flood, lightning, natural disaster, pollution, or improper supply voltage.
- ⑥ Damage or failure caused when product is used other than normal light duty operation (for example, heavy duty commercial use, installation on a vehicle or boat, etc.)
- ⑦ Conditions outside manufacturers responsibility, such as resale by 3rd party companies or users.

2. This document will not be replaced if lost, so please keep it in a safe place.

 Niigata Seiki Co., Ltd.

5-3-14, Tsukanome, Sanjo, Niigata, Japan, 955-0055
 Tel. : +81-256-33-5522 Fax. : +81-256-33-5518
 MAIL intl.sales@niigataseiki.co.jp
 URL https://www.niigataseiki.co.jp