

HDMI Cameras – H Series

# INSTRUCTION MANUAL

Model
C-HP4
C-HP4SC

Ver. 1.0 2023



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## 1. Warning

This device is a scientific precision instrument designed to last for many years with a minimum of maintenance. It is built to high optical and mechanical standards and to withstand daily use. We remind you that this manual contains important information on safety and maintenance, and that it must therefore be made accessible to the instrument users. We decline any responsibility deriving from incorrect instrument use uses that does not comply with this manual.

## 2. Safety Information



### Avoiding Electrical Shock

Before plugging in the power supply, make sure that the supplying voltage of your region matches with the operation voltage of the equipment and that the lamp switch is in off position. Users should observe all safety regulations of the region. The equipment has acquired the CE safety label. However, users have full responsibility to use this equipment safely. Please follow the guidelines below, and read this manual in its entirety to ensure safe operation of the unit.

### 3. Package content

#### 3.1 C-HP4



- ① Camera
- ② HDMI cable
- ③ USB2.0 cable
- ④ Wireless mouse

- ⑤ Micrometric slide
- ⑥ SD card 16GB
- ⑦ Power supply

#### 3.2 C-HP4SC



- ① Camera with fixing plate
- ② Camera power supply
- ③ Wireless mouse
- ④ HDMI monitor with fixing plate
- ⑤ Monitor power supply
- ⑥ Type "C" L-adapter

- ⑦ HDMI-to-mini HDMI L-adapter
- ⑧ HDMI cable
- ⑨ USB2.0 cable
- ⑩ SD card 16GB
- ⑪ Micrometric slide

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## 4. Unpacking

The device is housed in a moulded Styrofoam container. Remove the tape from the edge of the container and lift the top half of the container. Take some care to avoid that the optical items (objectives and eyepieces) fall out and get damaged. Using both hands (one around the arm and one around the base), lift the device from the container and put it on a stable desk.



Do not touch with bare hands optical surfaces such as lenses, filters or glasses. Traces of grease or other residuals may deteriorate the final image quality and corrode the optics surface in a short time.

## 5. Intended use

### Standard models

For research and teaching use only. Not intended for any animal or human therapeutic or diagnostic use.

### IVD Models

Also for diagnostic use, aimed at obtaining information on the physiological or pathological situation of the subject.

## 6. Symbols and conventions

The following chart is an illustrated glossary of the symbols that are used in this manual.



### CAUTION

This symbol indicates a potential risk and alerts you to proceed with caution.



### ELECTRICAL SHOCK

This symbol indicates a risk of electrical shock.

## 7. Instrument description

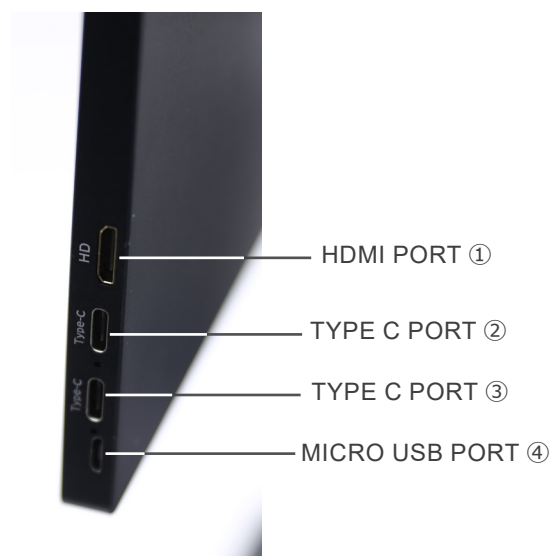
### 7.1 Camera control panel



- ① USB mouse connector
- ② USB2.0 connector
- ③ HDMI connector
- ④ ON-OFF button

- ⑤ SD card slot
- ⑥ Power supply plug
- ⑦ LED indicator

### 7.2 HDMI monitor



- ① HDMI camera connection
- ② Video Display / Audio / Touch Control

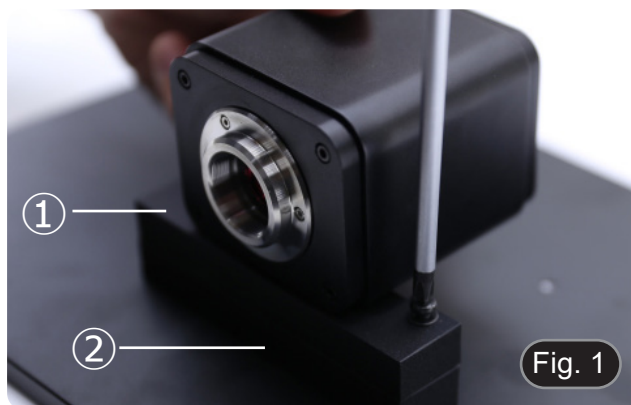
- ③ Power Supply / USB3.0 port
- ④ Keyboard / Mouse connection

**NOTE:** When using the monitor in this configuration, the Headphone, Type C ② and Micro USB ④ ports are not used.

## 8. Assembling

### 8.1 C-HP4SC

1. Using the supplied screws, join the fixing plate mounted on the camera ① and the fixing plate mounted on the monitor ②. (Fig. 1)



2. Screw the "C" mount adapter ③ to the camera ④. (Fig. 2)



3. Loosen the clamping screw ⑤ on the trinocular port and remove the dust cap ⑥. (Fig. 3)



4. Insert the round dovetail of the "C" mount into the empty hole of the trinocular port, then tighten the clamping screw ⑤. (Fig. 4)



5. Plug the USB mouse receiver in the “USB MOUSE” port ① on the camera. (Fig. 5)



6. Connect the cable with the HDMI side ① to the provided HD-MI-HDMI L-adapter ②. (Fig. 6)
7. Connect the HDMI L-adapter to the “HDMI” port ② on the camera.



8. Plug mini HDMI cable to the mini HDMI port ③ placed on the right side of the monitor. (Fig. 7)

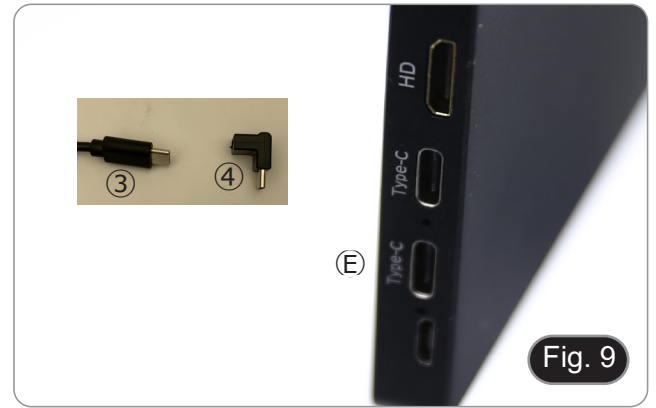


9. Insert the SD card into “SD” slot ④ for saving captured images and recorded videos. (Fig. 8)





10. Plug the monitor power supply connector ③ in the provided “L” adapter ④. (Fig. 9)
11. Plug the “L” adapter in the “Type C” port ⑤ placed on the right side of the monitor.
12. Plug the power supply to the wall outlet.



13. Insert the camera power supply jack in the “DC12V” socket ⑥. (Fig. 10)
14. Plug the power supply to the wall outlet.



## 8.2 Parfocality adjustment

In order to have the same focus when observing the specimen through the eyepieces and on the monitor, please check that the microscope is properly set and follow the instructions below.

1. Use a low power objective and focus the specimen using the microscope focus knobs.
2. Switch to the highest dry objective available on the microscope (40x or 60x) and focus the specimen again.
3. Turn on the live-view on the camera, without changing the focus on the microscope.
4. While observing the image on the monitor, adjust the focus by turning the knurled knob on the C-mount adapter. (Fig. 11)



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## 9. C-HP4 Basic features

C-HP4 is a multiple interfaces (HDMI + USB2.0 + SD card) CMOS camera. HDMI and USB2.0 are used as the data transfer interface to HDMI display or computer.

- For HDMI output, the *Camera Control Panel + Measurement Toolbar* and *Camera Control Toolbar* are overlaid on the HDMI screen when the mouse move to the related region. In this case, the USB mouse can be used to set the camera, browse and compare the captured image, play the video and perform the measurement.
- For USB output, connect computer with USB connection to transfer video in real time. From here the ProView software can control each camera function.

### 9.1 Quick Instructions for C-HP4 camera

You can use the C-HP4 camera in 2 different ways. Each application requires different hardware environment.

#### 9.1.1 HDMI Mode

1. Plug the HDMI cable into the HDMI port ③ to connect the C-HP4 camera to HDMI display.
2. Plug the USB mouse into USB Mouse port ① to get control of the camera by using built-in software HDMI pro.
3. Plug 12V/1A power adapter into DC 12V slot ⑥ to supply power for the camera. The LED Indicator ⑦ will turn into red.
4. Insert SD card into SD Card slot ⑤ for saving captured images and recorded videos.
5. Press ON/OFF Button ④ to turn on the camera. The LED indicator will turn into blue.
6. Move mouse cursor to the left side of the video window, a *Camera Control Panel* will appear. It includes Manual/ Automatic Exposure, White Balance, Sharpness and other functions, please refer to 10.1 for details.
7. Move mouse cursor to the bottom of the video window and a *Camera Control Toolbar* will appear. Operations like Zoom In, Zoom Out, Flip, Freeze, Cross Line, Comparison and so on can be achieved. Please refer to 10.3 for details.
8. Move mouse cursor to the upper side of the video window, a *Measurement Toolbar* with calibration and other measurement tools will appear, please refer to 10.2 for details. The measurement data can be output with \*.CSV format.

#### 9.1.2 USB Mode

1. Plug the USB cable provided with the camera into USB2.0 ② to connect the C-HP4 camera to the computer.
  2. Plug 12V/1A power adapter into DC 12V slot ⑥ to supply power for the camera. The LED Indicator ⑦ will turn into red.
  3. Press ON/OFF button ④ to turn on the camera. The LED indicator will turn into blue.
  4. Start the ProView software.
  5. Clicking the camera name in the camera list starts the live video.
- **NOTE: When the USB cable and the mouse are plugged into the camera at the same time, the USB cable has priority and the mouse is not available; when the USB cable is unplugged, the mouse can be used normally.**

## 10. C-HP4 User Interface (UI) and its Functions

The C-HP4 UI shown in Fig. 12 includes a *Camera Control Panel* on the left side of the video window, a *Measurement Toolbar* on the upper side of the video window, a *Camera Control Toolbar* on the bottom of the video window.

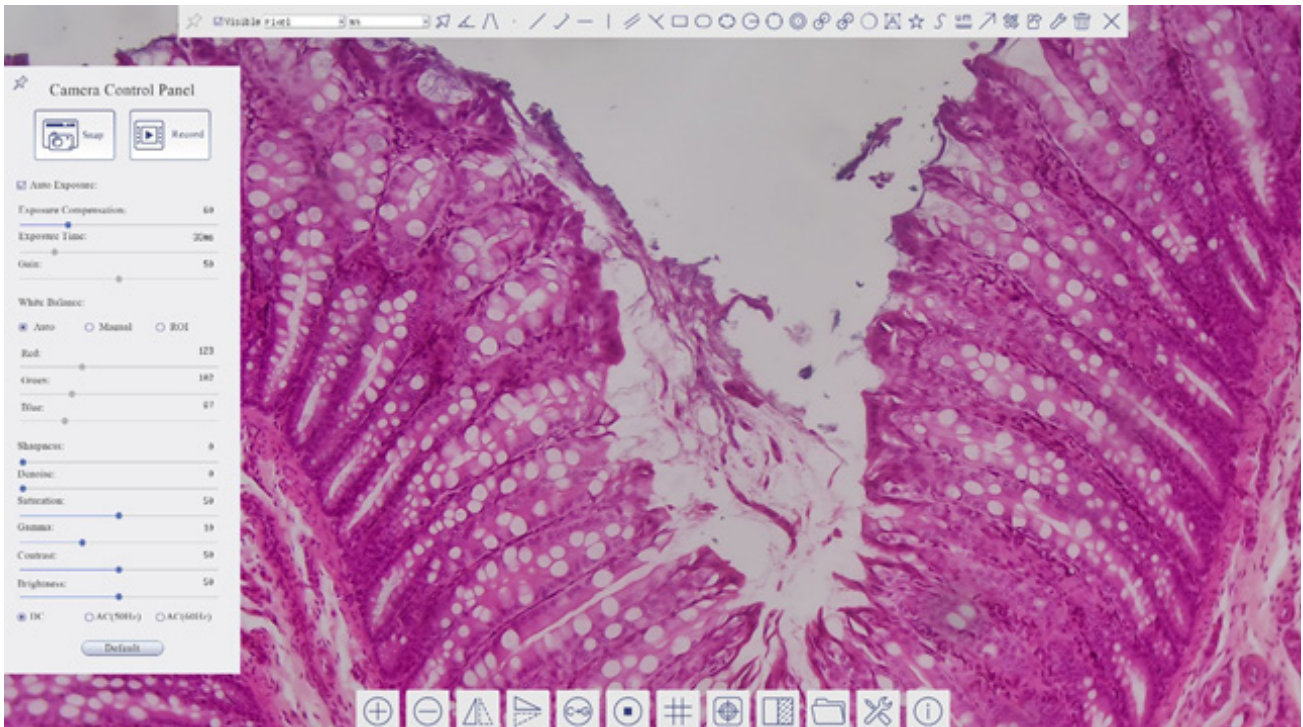






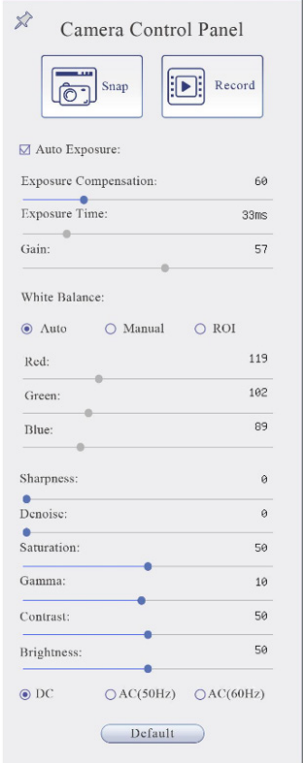
Fig. 12 - Camera Control User Interface

1. Move the mouse cursor to the left side of the video window: the *Camera Control Panel* will pop up automatically.
2. Move the mouse cursor to the upper side of the video window: a *Measurement Toolbar* will pop up for the calibration and measurement operations.
  - When user left-clicks the *Float/Fixed* button  on the Measurement Toolbar, the Measurement Toolbar will be fixed. In this case the Camera Control Panel will not pop up automatically even if users move mouse cursor to left side of the video windows.
  - Only when user left-clicks the  button on the *Measurement Toolbar* to exit from measuring procedure it will be possible to perform other operations on the *Camera Control Panel*, or *Camera Control Toolbar*.
  - During the measuring process, when a specific measuring object is selected an *Object Location & Attributes Control Bar*  will appear for changing location and properties of the selected objects.
3. Move the mouse cursor to the bottom of the video window, the *Camera Control Toolbar* will pop up automatically.



## 10.1 The Camera Control Panel

The *Camera Control Panel* controls the camera to achieve the best image quality according to the specific applications. It will pop up automatically when mouse cursor is moved to the left side of the video window (in measurement status, the Camera Control Panel will not pop up. Only when measurement process is terminated the Camera Control Panel will pop up by moving mouse cursor to the left side of the video window). Left-clicking button  to achieve *Display/ Auto Hide* switch of the Camera Control Panel.

Control Panel	Function	Description
	<b>Snap</b>	Capture image from the current video window
	<b>Record</b>	Record video from the current video window
	<b>Auto Exposure</b>	When Auto Exposure is checked, the system will automatically adjust exposure time according to the value of exposure compensation
	<b>Exposure Compensation</b>	Available when Auto Exposure is checked. Slide to left or right to adjust Exposure Compensation according to the current video brightness to achieve proper brightness value
	<b>Exposure Time</b>	Available when Auto Exposure is unchecked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
	<b>Gain</b>	Adjust Gain to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
	<b>Auto White Balance</b>	White Balance adjustment according to the window video every time the button is clicked
	<b>Manual White Balance</b>	Slide Red or Blue cursors to manually set the video White Balance
	<b>ROI White Balance</b>	When the ROI region is moved, white Balance can be adjusted according to content inside the ROI region.
	<b>Red</b>	Slide to left or right to decrease or increase the proportion of Red in RGB on video
	<b>Green</b>	Slide to left or right to decrease or increase the proportion of Green in RGB on video
	<b>Blue</b>	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
	<b>Sharpness</b>	Adjust Sharpness level of the video window
	<b>Denoise</b>	Slide left or right to denoise the image
	<b>Saturation</b>	Adjust Saturation level of the video window
	<b>Gamma</b>	Adjust Gamma level of the video. Slide to the right side to increase gamma and to the left to decrease gamma
	<b>Contrast</b>	Adjust Contrast level of the video. Slide to the right side to increase contrast and to the left to decrease contrast
	<b>DC</b>	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
	<b>AC(50HZ)</b>	Check AC(50HZ) to eliminate flickering "strap" caused by 50Hz illumination
	<b>AC(60HZ)</b>	Check AC(60HZ) to eliminate flickering "strap" caused by 60Hz illumination
<b>Default</b>	Restore all the settings in the Camera Control Panel to default values	











## 10.2 The Measurement Toolbar

The *Measurement Toolbar* will pop up when moving mouse cursor to any place near the upper side of the video window.






Fig. 13 - The Measurement Toolbar

Icon	Function
	<i>Float/ Fix</i> switch of the <i>Measurement Toolbar</i>
<input checked="" type="checkbox"/> Visible	Define measuring object in <i>Show up/ Hide</i> mode
Nanometer (nm)	Select the desired <i>Measurement Unit</i>
4X	Select <i>Magnification for Measurement after Calibration</i>
	<i>Object Select</i>
	<i>Angle</i>
	<i>4 Points Angle</i>
	<i>Point</i>
	<i>Arbitrary Line</i>
	<i>3 Points Line</i>
	<i>Horizontal Line</i>
	<i>Vertical Line</i>
	<i>3 Points Vertical line</i>
	<i>Parallel</i>
	<i>Rectangle</i>
	<i>Ellipse</i>
	<i>5 Points Ellipse</i>
	<i>Circle</i>
	<i>3 Points Circle</i>
	<i>Annulus</i>
	<i>Two Circles and Center Distance</i>
	<i>3 Points Two Circles and Center Distance</i>
	<i>Arc</i>
	<i>Text</i>

	<i>Polygon</i>
	<i>Curve</i>
	<i>Scale Bar</i>
	<i>Arrow</i>
	Execute <i>Calibration</i> to determine the corresponding relation between magnification and resolution, which will establish the corresponding relationship between measurement unit and the sensor pixel size. <i>Calibration</i> needs to be done with the help of a micrometer. For detailed steps of carrying out <i>Calibration</i> please refer to chapter 10.3.
	Export the <i>Measurement</i> to CSV file(*.csv)
	<i>Measurement Setup</i>
	<i>Delete All</i> the Measurement Objects
	<i>Exit</i> from <i>Measurement</i> mode
	When the measurement ends, left-click on a single measuring object and the <i>Object Location &amp; Properties Control Bar</i> will show up. User could move the object by dragging the object with the mouse. But more accurate movement could be done with the control bar. The icons on the control bar mean <i>Move Left, Move Right, Move Up, Move Down, Color Adjustment</i> and <i>Delete</i> .

Note:


1. When user left-clicks *Display/Hide* button  on the *Measurement Toolbar*, it will be fixed. In this case the *Camera Control Panel* will not pop up automatically even if moving the mouse cursor to the left edge of the video window. Only when user left-click the  button on the *Measurement Toolbar* to exit from the measurement mode it will be possible to perform other operations on the *Camera Control Panel* or on the *Camera Control Toolbar*.
2. When a specific item is selected during the measurement process, the *Object Location & Attributes Control Bar*  will appear for changing the object location and properties of the selected objects.

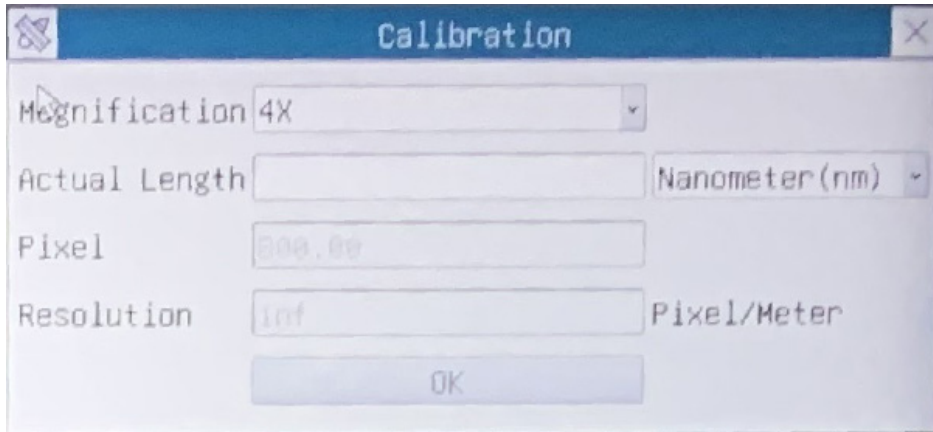


### 10.3 Camera calibration

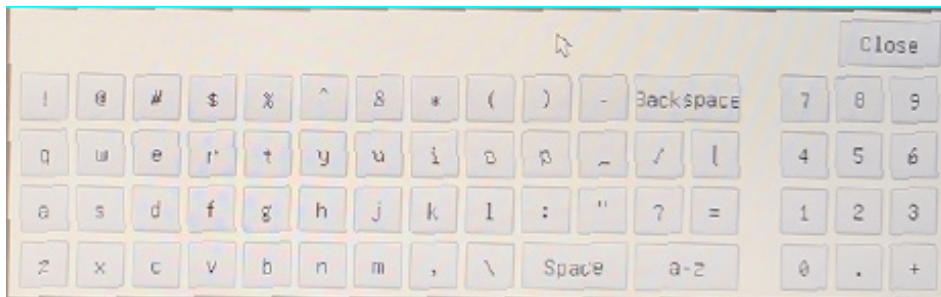
The camera must be calibrated before any measurements can be taken. To do this it is necessary to use the micrometer slide supplied with the camera.

Detailed procedure is the following:

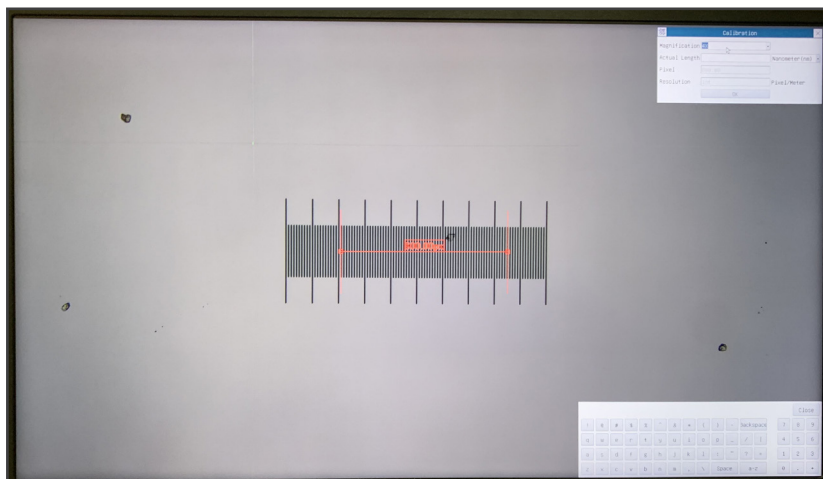
1. Insert the objective with the lowest magnification available and put the stage micrometer on the stage.
2. Click on the “Calibrate”  button in the Measurement toolbar.
3. The following dialog box appears:



4. In the *Magnification* field enter the current magnification
  - Some magnification values (default ones 4x, 10x, 20x, 40x and 100x) are preset in the drop-down list.
  - If user must insert a different magnification value, double click in the *Magnification* field. The following dialog box appears:



- From here user can enter any desired magnification value.
5. Focus the ruler under the microscope.
    - Along with the previous dialog box a red line appears on the image. This line is the calibration line.



- 
6. Align the two ends of the red line with the ruler scale (try to use as many notches as possible to keep the calibration accuracy).
  7. Set the desired unit (micrometer, millimeter or nanometer) in the *Calibration* dialog box.
  8. Insert the length of the drawn line in the *Actual Length* field (using the same procedure described above).
    - Micrometric slide has two rulers (see chapter 11). One is 1 mm/100 (for biological microscopes) and the other is 10mm/100 (for stereomicroscopes).
    - When using the ruler 1mm/100 the interval between two long lines is 100  $\mu\text{m}$ , while using the ruler 10mm/100 the interval between two long lines is 1000  $\mu\text{m}$ .
  9. If everything is fine, click *OK* to end the calibration. The new magnification (the number you entered in the Magnification edit box) will be available in the *Magnification* drop-down list.
  10. Repeat the same procedure for each magnification available in your microscope.



## 10.4 Icons and Functions of the Camera Control Toolbar

Icon	Function	Icon	Function
	Zoom In the Video Window		Zoom Out the Video Window
	Horizontal Flip		Vertical Flip
	Color / Gray		Video Freeze
	Display Cross Line		Overlay
	Compare stored image with the current live image		Browse Images and Videos in the SD Card
	Settings		Check the HDMI pro Version

The *Setting* function is relatively more complicated than the other functions. Here are more info about it:

### 10.4.1 Setting > Measurement

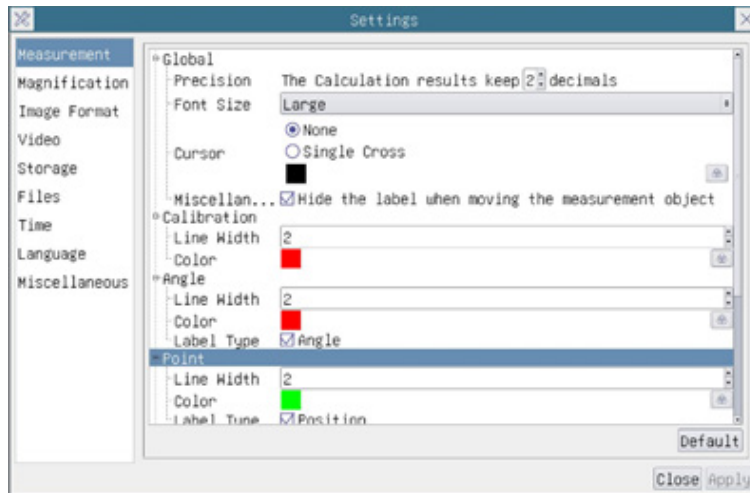


Fig. 14 - Measurement Setting Page

<i>Global</i>	Used for setting digits behind the decimal point for measurement results		
<i>Calibration</i>	<i>Line Width</i>	Used for defining width of the lines for calibration	
	<i>Color</i>	Used for defining color of the lines for calibration	
	<i>EndPoint</i>	<i>Type:</i>	Used for defining shape of the endpoints of lines for calibration
<i>Null:</i>		Means no endpoints	
<i>Rectangle:</i>		Means rectangle type of endpoints. It makes alignment more easily	
<i>Point, Angle, Line, Horizontal Line, Vertical Line, Rectangle, Circle, Ellipse, Annulus, Two Circles, Polygon, Curve:</i>			
Left-click the  beside the measuring patterns mentioned above will unfold the corresponding attribute settings to set the individual property of the measuring objects			

### 10.4.2 Setting > Magnification

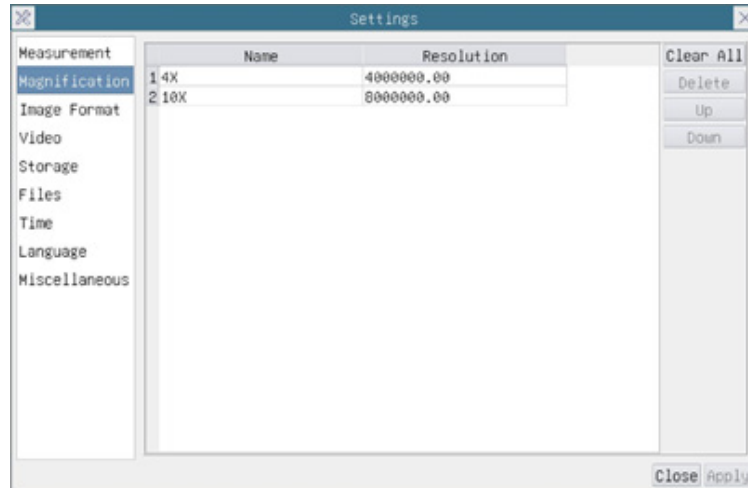


Fig. 15 - Magnification Settings Page

<i>Name</i>	Names 10X, 40X, 100X are based on magnification of the microscopes. For continuous zoom microscopes, ensure that the selected magnification coincides with the scale alignment line on the zoom knob
<i>Resolution</i>	Pixels per meter. Devices like microscopes have high resolution value
<i>Clear All</i>	Click the Clear All button will clear the calibrated magnifications and resolutions
<i>Delete</i>	Click Delete to delete the selected item for specific resolution
<i>Up</i>	Click <i>Move Up</i> to move up the selected Magnification
<i>Down</i>	Click <i>Move Down</i> to move down the selected Magnification

### 10.4.3 Setting > Image Format

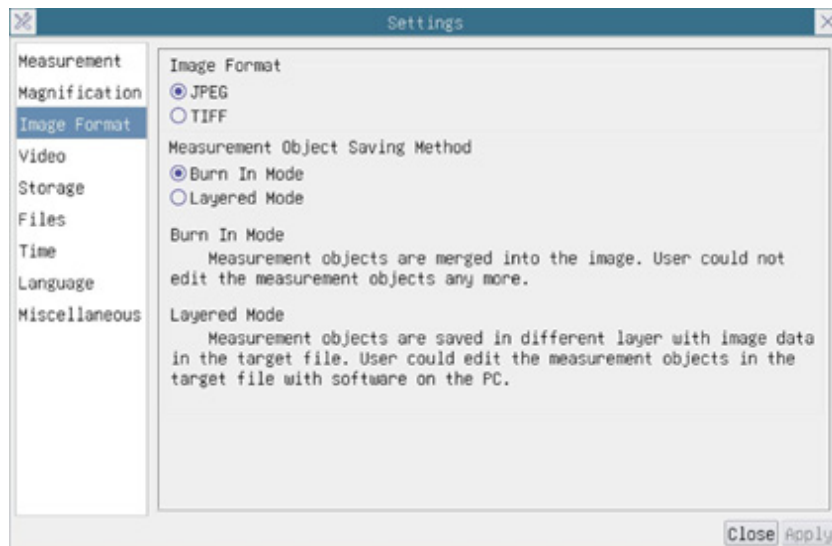


Fig. 16 - Image Format Settings Page

<i>Image Format</i>	<i>JPEG</i>	A JPEG file can get very high compression rate and display very rich and vivid images by removing redundant images and color data. In other words, it can get better image quality with the least disk space. If measurement objects are available, the measurement objects will be burned into the image and the measurement cannot be edited
	<i>TIFF</i>	TIFF is a bitmap format mainly used to store images including photos and artistic images
<i>Measurement Object Save Method</i>	<i>Burn in Mode</i>	The measurement objects are merged into the current image. User could not edit the measurement objects anymore. This mode is not reversable
	<i>Layered Mode</i>	The measurement objects are saved in different layer with current image data in the target file. User could edit the measurement objects in the target file with some software on the PC. This mode is reversable

#### 10.4.4 Setting > Video

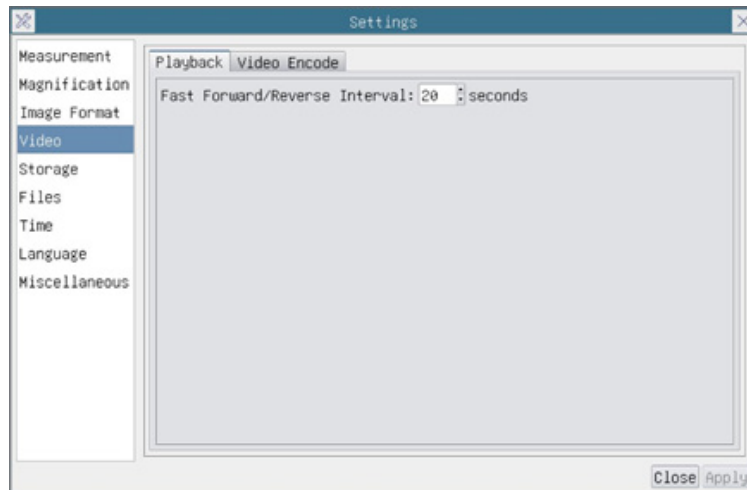


Fig. 17a - Video Settings Page - Playback

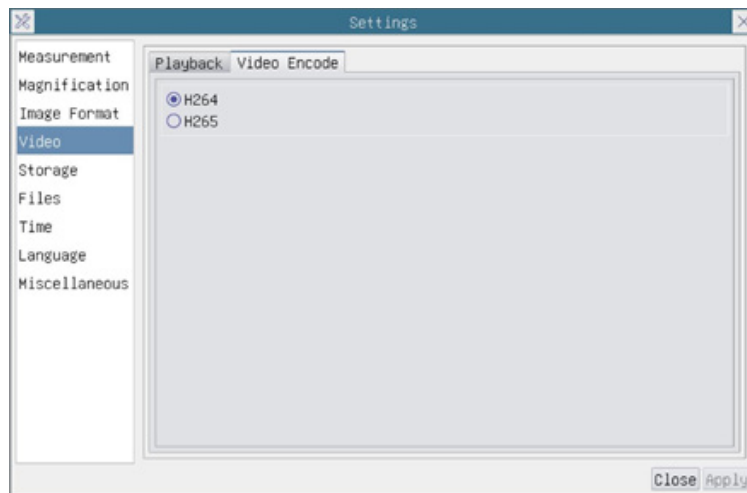


Fig. 17b - Video Settings Page - Video Encode

<i>Fast Forward/Reverse interval</i>	The time interval in second units for Video Playback
<i>Video Encode</i>	You can choose <i>H264</i> or <i>H265</i> encoding. H265 encoding can significantly reduce encoding bandwidth and save storage space under the same encoding quality.

## 10.4.5 Setting > Storage

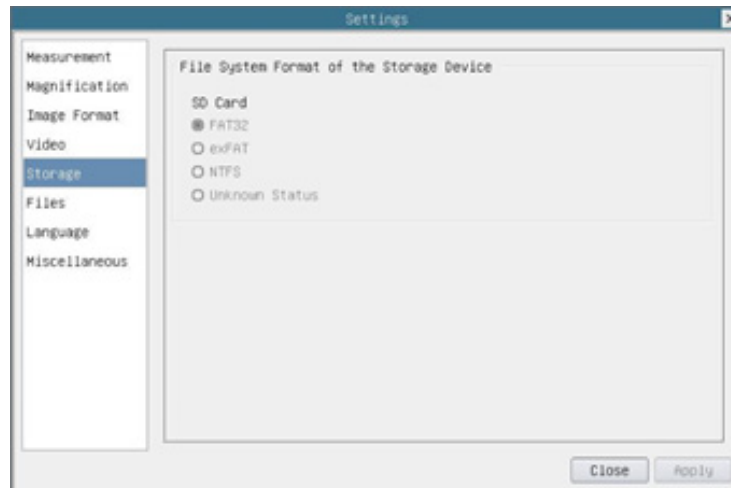


Fig. 18 - SD Card Settings Page

<i>Storage Device</i>	<i>SD Card:</i>	only SD Card is supported as the storage device
<i>File System Format of the Storage Device</i>		List the file system format of the current storage device
	<i>FAT32</i>	The file system of SD card is FAT32. The maximum file size of single file is 4GB
	<i>exFAT</i>	The file system of SD card is exFAT. The maximum file size of single file is 4GB
	<i>NTFS</i>	The file system of SD card is NTFS. The maximum file size of single file is 4GB
	<i>Unknown Status</i>	SD card not detected or the file system is not identified

Use PC to format the SD Card and switch between FAT32, exFat and NTFS

## 10.4.6 Setting > Files

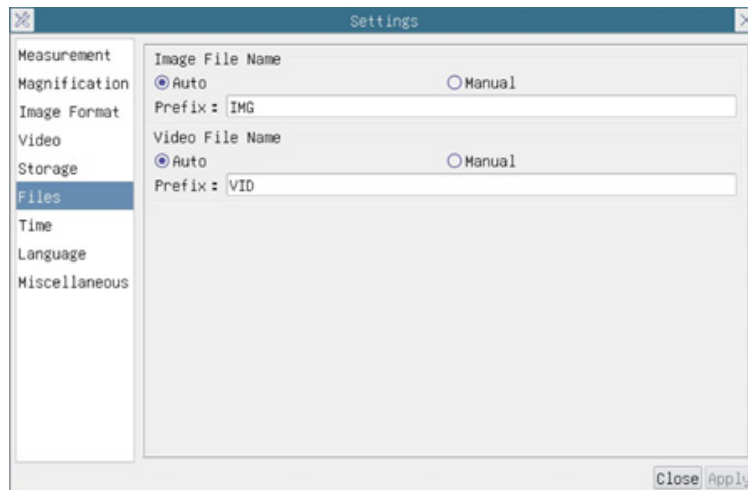


Fig. 19 - Files Settings Page

<i>Image File Name</i>	<i>Auto:</i>	The image files will be saved automatically with the specified prefix
	<i>Manual:</i>	User has to specify the Image file name before image saving
<i>Video File Name</i>	<i>Auto:</i>	The video file will be saved automatically with the specified prefix
	<i>Manual:</i>	User has to specify the Video File Name before video recording

## 10.4.7 Setting > Language

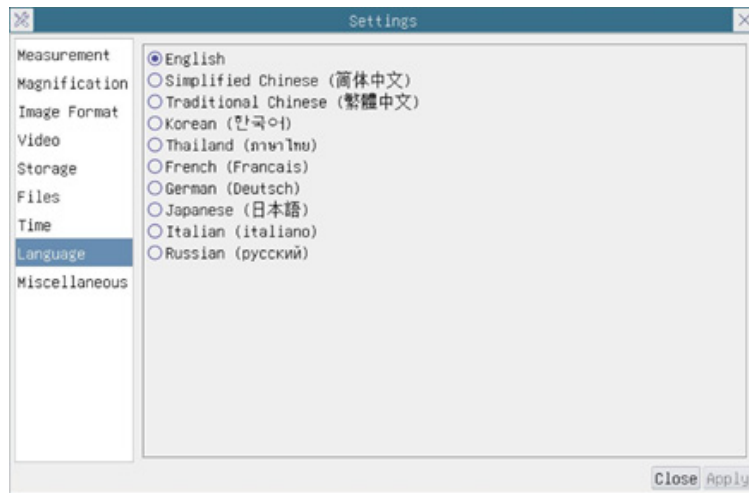


Fig. 20 - Language Selection Settings Page

<i>English</i>	Set language of the whole software into English
<i>Simplified Chinese</i>	Set language of the whole software into Simplified Chinese
<i>Traditional Chinese</i>	Set language of the whole software into Traditional Chinese
<i>Korean</i>	Set language of the whole software into Korean
<i>Thailand</i>	Set language of the whole software into Thai
<i>French</i>	Set language of the whole software into French
<i>German</i>	Set language of the whole software into German
<i>Japanese</i>	Set language of the whole software into Japanese
<i>Italian</i>	Set language of the whole software into Italian
<i>Russian</i>	Set language of the whole software into Russian

## 10.4.8 Setting > Miscellaneous

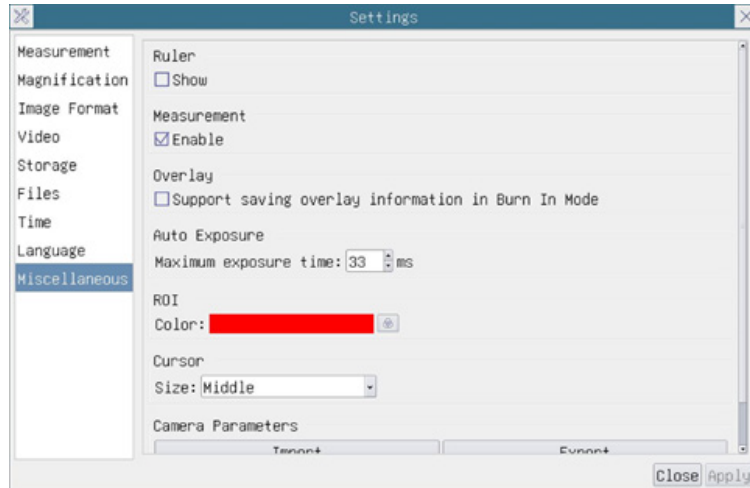


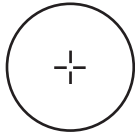
Fig. 21 - Miscellaneous Settings Page

<i>Ruler</i>	Select to display the ruler in the video window, otherwise not to display the ruler
<i>Measurement</i>	Select to display the Measurement toolbar in the video window, otherwise, the Measurement toolbar will not be displayed
<i>Overlay</i>	Select to support saving graphics overlay information in fusion mode, otherwise it will not support
<i>Auto Exposure</i>	The maximum exposure time during auto exposure process could be specified. Setting this item to a lower value could guarantee a faster frame rate during Auto Exposure
<i>ROI Color</i>	Choosing the <i>ROI</i> rectangle line color
<i>Cursor</i>	Choosing the <i>Cursor</i> size according to the screen resolution or personal preference
<i>Camera Parameters Import</i>	<i>Import</i> the Camera Parameters from the SD Card or USB flash drive to use the previously exported Camera Parameters
<i>Camera Parameters Export</i>	<i>Export</i> the Camera Parameters to the SD Card or USB flash drive to use the previously exported Camera Parameters
<i>Reset to factory defaults</i>	<i>Restore</i> camera parameters to its factory status

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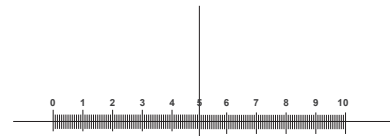
## 11. Micrometric Slide M-005

Micrometric slide, 26x76mm, with 2 scales  
(1mm/100div. for biological microscopes / 10mm/100div. for stereomicroscopes)



1 DIV=0.01mm

**For biological microscopes calibration**



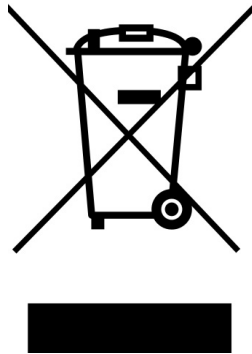
1 DIV=0.1mm

**For stereomicroscopes calibration**

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## Equipment disposal

Art.13 Dlsg 25 July 2005 N°151. "According to directives 2002/95/EC, 2002/96/EC and 2003/108/EC relating to the reduction in the use of hazardous substances in electrical and electronic equipment and waste disposal."



The basket symbol on equipment or on its box indicates that the product at the end of its useful life should be collected separately from other waste. The separate collection of this equipment at the end of its lifetime is organized and managed by the producer. The user will have to contact the manufacturer and follow the rules that he adopted for end-of-life equipment collection. The collection of the equipment for recycling, treatment and environmentally compatible disposal, helps to prevent possible adverse effects on the environment and health and promotes reuse and/or recycling of materials of the equipment. Improper disposal of the product involves the application of administrative penalties as provided by the laws in force.



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