

HDMI Cameras – H Series

# INSTRUCTION MANUAL

Model
C-HB
C-HBSC
C-WH5
C-WH5SC

Ver. 1.6 2026



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## Table of Contents

1.	Warning	3
2.	Safety Information	3
3.	Package content	4
3.1	C-HB	4
3.2	C-HBSC	4
3.3	C-WH5	5
3.4	C-WH5SC	5
4.	Unpacking	6
5.	Intended use	6
6.	Symbols and conventions	6
7.	Instrument description	7
7.1	C-HB control panel	7
7.2	C-WH5 control panel	7
7.3	C-HBSC / C-WH5SC	8
8.	Assembling	9
8.1	C-HBSC / C-WH5SC	9
8.2	C-HB / C-WH5	11
8.2.1	Trinocular port with focusable “C” mount adapter	11
8.2.2	Trinocular port with projection lens	12
8.2.3	Binocular or monocular head	13
8.3	Parfocality adjustment	14
8.3.1	Biological microscope	14
8.3.2	Stereomicroscope with “C” mount adapter	14
8.3.3	Stereomicroscope with projection lens	14
9.	C-HB Basic features	15
9.1	Quick Instructions for C-HB camera	15
9.1.1	HDMI Mode	15
10.	C-HB User Interface (UI) and Its Functions	16
10.1	The Camera Control Panel	17
10.2	Icons and Functions of the Camera Control Toolbar	18
10.3	The Measurement Toolbar	24
10.4	Camera calibration	26
11.	C-WH5 Basic features	27
11.1	Quick Instructions for C-WH5 camera	27
11.1.1	WiFi mode	28
11.1.2	HDMI mode	28
12.	C-WH5 User Interface (UI) and Its Functions	29
12.1	The Camera Control Panel	30
12.2	Icons and Functions of the Camera Control Toolbar	31
12.3	The Measurement Toolbar	36
12.4	Camera calibration	37
13.	Micrometric Slide M-005	39
	Equipment disposal	40

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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

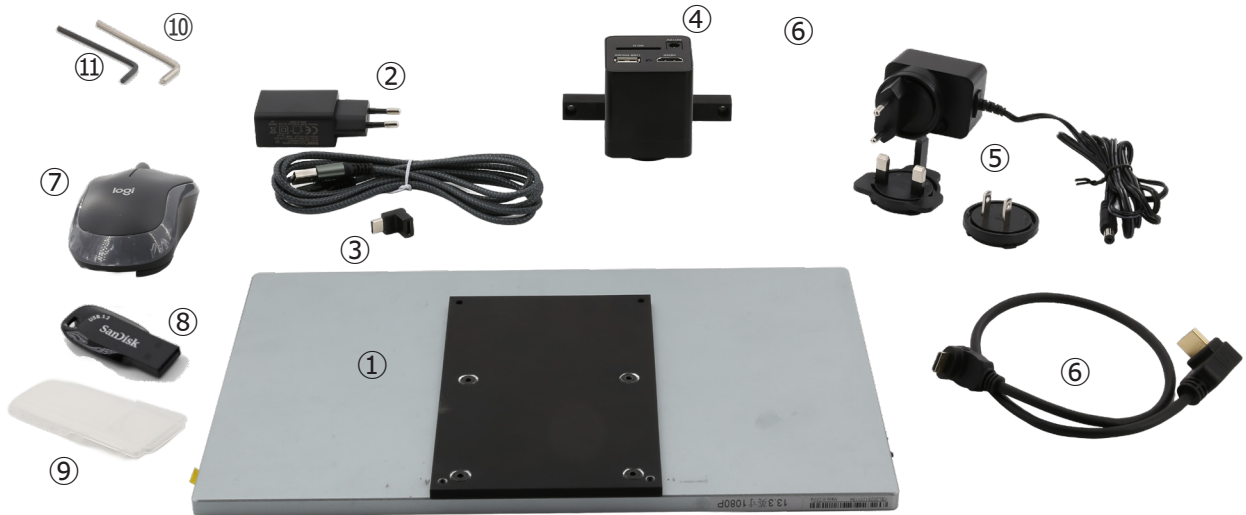
#### 3.1 C-HB



- ① Camera
- ② HDMI cable
- ③ Wireless mouse

- ④ USB flash disc
- ⑤ Micrometric slide
- ⑥ Power supply

#### 3.2 C-HBSC



- ① Monitor + mounting bracket
- ② Monitor power supply + cable
- ③ USB-C "L" adapter
- ④ Camera + mounting bracket
- ⑤ Camera power supply
- ⑥ 30cm HDMI cable

- ⑦ Wireless mouse
- ⑧ USB flash disc
- ⑨ Micrometric slide
- ⑩ 3mm Allen wrench
- ⑪ 2.5mm Allen wrench

### 3.3 C-WH5



- ① Camera
- ② WiFi adapter
- ③ HDMI cable
- ④ Wireless mouse

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

### 3.4 C-WH5SC



- ① Camera + mounting bracket
- ② WiFi adapter
- ③ Monitor + mounting bracket
- ④ Monitor power supply + cable
- ⑤ USB-C "L" adapter
- ⑥ 30cm HDMI cable

- ⑦ Wireless mouse
- ⑧ Camera power supply
- ⑨ SD card
- ⑩ Micrometric slide
- ⑪ 3mm Allen wrench
- ⑫ 2.5mm Allen wrench

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## 4. Unpacking

The system 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 fall out and get damaged.

## 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 C-HB control panel



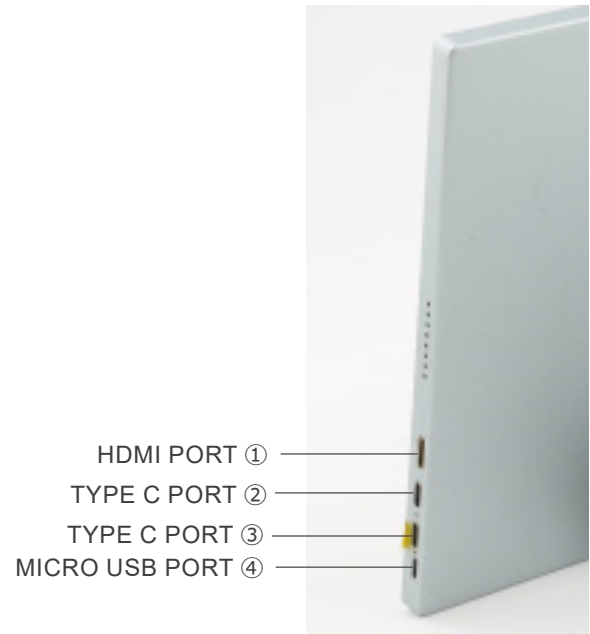
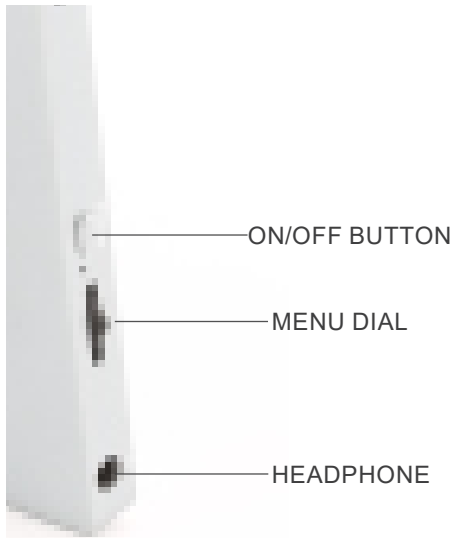
- ① HDMI port
- ② USB mouse port
- ③ USB flash disc port
- ④ Power supply plug
- ⑤ LED indicator

### 7.2 C-WH5 control panel



- ① HDMI port
- ② WiFi/USB mouse port
- ③ Power supply plug
- ④ SD card slot
- ⑤ ON-OFF button
- ⑥ LED indicator

### 7.3 C-HBSC / C-WH5SC



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 ③ and Micro USB ④ ports are not used.**

## 8. Assembling

### 8.1 C-HBSC / C-WH5SC

1. Using the supplied screws, join the camera ① to the fixing bracket already installed on the monitor ②. (Fig. 1)



2. Screw the "C" mount 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)



- **C-HB**

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

- **C-WH5**

6. Plug the USB mouse receiver in the “WIFI/USB MOUSE” port ② on the camera. (Fig. 5)



7. Connect the cable with the HDMI side to the “HDMI” port ③ on the camera. (Fig. 6)



8. Plug the cable with the mini HDMI side to the mini HDMI port ④ placed on the right side of the monitor. (Fig. 7)



- **C-HB**

9. Plug the USB flash disc in the “USB2.0” port ⑤ on the camera. (Fig. 8)

- **C-WH5**

10. Plug the SD card in the SD slot ⑥ on the camera. (Fig. 8)



11. Plug the monitor power supply port in the “Type-C” port ⑥ placed on the right side of the monitor. (Fig. 9)
12. Plug the power supply to the wall outlet.



Fig. 9

13. Insert the camera power supply jack in the “DC12V” socket ⑦. (Fig. 10)
14. Plug the power supply to the wall outlet.



Fig. 10

## 8.2 C-HB / C-WH5

### 8.2.1 Trinocular port with focusable “C” mount adapter

1. Remove the dust cover from camera and from “C” mount adapter.
2. Screw the “C” mount adapter to the camera’s thread. (Fig. 11)



Fig. 11

3. Loosen the clamping screw on the trinocular port of the microscope, remove the dust cover and install the camera “C” mount unit previously assembled. (Fig. 12)

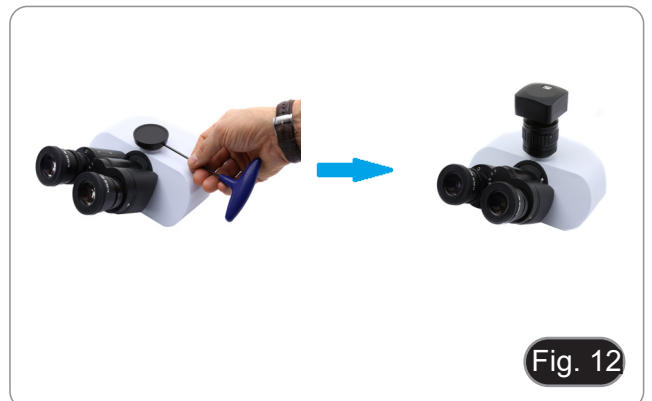


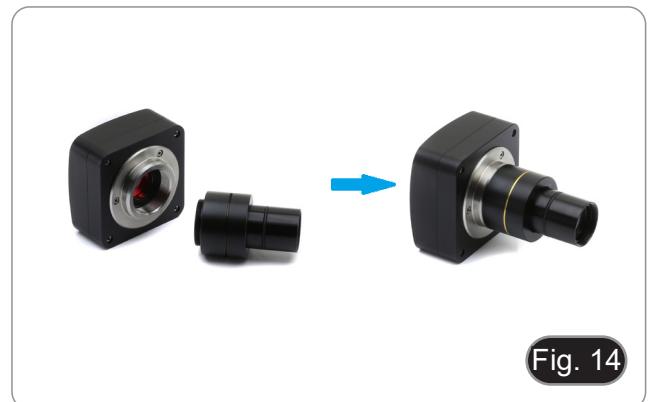
Fig. 12

4. Tighten the clamping screw firmly. (Fig. 13)



### 8.2.2 Trinocular port with projection lens

1. Remove the dust cover from camera and from projection lens.
2. Screw the projection lens to the camera's thread. (Fig. 14)



- **Installing on biological microscopes**

3. Insert the final part of the projection lens into the empty hole of the photo tube. (Fig. 15)



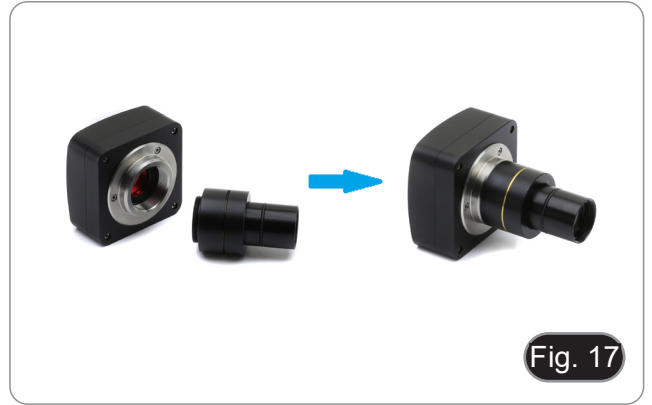
- **Installing on stereomicroscopes**

4. Insert the final part of the projection lens into the empty hole of the photo tube. (Fig. 16)



### 8.2.3 Binocular or monocular head

- Any OPTIKA monocular or binocular microscope/stereomicroscope.
  - Any non-OPTIKA monocular or binocular microscope/stereomicroscope.
1. Remove the dust cover from camera and from projection lens.
  2. Screw the projection lens to the camera's thread. (Fig. 17)



3. Remove one eyepiece from the observation head. (Fig. 18)



4. Insert the final part of the projection lens into the empty eyepiece sleeve. (Fig. 19)



5. In case of eyepiece sleeve with diameter 30 or 30.5 mm use the adapter rings. (Fig. 20)



### 8.3 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.

#### 8.3.1 Biological microscope

1. Use a low power objective and focus the specimen.
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 screen/monitor, adjust the focus by turning the knurled knob on the C-mount adapter. (Fig. 21)



#### 8.3.2 Stereomicroscope with "C" mount adapter

1. Use a low power magnification and focus the specimen.
2. Reach the highest magnification available using the zoom knob and then 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 screen/monitor, adjust the focus by turning the knurled knob on the C-mount adapter. (Fig. 22)



#### 8.3.3 Stereomicroscope with projection lens

1. Use a low power magnification and focus the specimen.
2. Reach the highest magnification available using the zoom knob and then 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 screen/monitor, unscrew the fixing knob ① of the trinocular port (Fig. 22) and move up or down the movable part of the adapter ② until the focus is achieved on the camera. (Fig. 23)
5. Lock the fixing knob ①. (Fig. 22)



The proper parfocality adjustment is obtained when the same focus is reached when looking into the eyepieces and on the screen/monitor.

## 9. C-HB Basic features

C-HB is a HDMI + SD card CMOS camera.  
HDMI is used as the data transfer interface to HDMI display.

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.

The USB mouse is used to set the camera.

The C-HB's basic features are as follows:

For HDMI output:

- All in 1(HDMI + USB flash disc) C-mount camera with Aptina high sensitivity CMOS sensor.
- Resolution 2MP (1080p):
- Built-in mouse control.
- Built-in image capture to USB flash disc.
- Built-in camera control panel, including exposure (manual/auto) / gain, color adjustment, sharpness control.
- Built-in toolbar including zoom, mirror, freeze, crosshair.0
- Built-in toolbar for measurement.

### 9.1 Quick Instructions for C-HB camera

Before turning on the camera, please connect the standard C-mount camera to the camera adapter and insert it into the microscope's trinocular port.



Figure 24 - C-HB Rear Panel

- |                     |                       |
|---------------------|-----------------------|
| ① HDMI port         | ④ USB flash disc port |
| ② USB mouse port    | ⑤ LED indicator       |
| ③ Power supply port |                       |

#### 9.1.1 HDMI Mode

1. Plug the HDMI cable into the "HDMI" port ① to connect the C-HB camera to HDMI display.
2. Plug a USB mouse into "USB Mouse" port ② to get control of the camera by using built-in software.
  - **The camera cannot be connected to a PC in any way.**
3. Insert USB Drive "USB2.0" port ④ for saving captured images.
4. Plug 12V/1A power adapter into "DC12V" slot ③ to supply power for the camera.
  - The LED Indicator ⑤ will turn into blue.
5. 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.
6. 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, and etc. can be achieved. Please refer to 10.2 for details.
7. 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 10.3 for details. The measurement data can be output with \*.CSV format.

## 10. C-HB User Interface (UI) and Its Functions

The C-HB UI shown in Fig. 25 includes a *Camera Control Panel* on the left side of the video window, a *Camera Control Toolbar* on the bottom of the video window and a *Measurement Toolbar* on the top of the video.

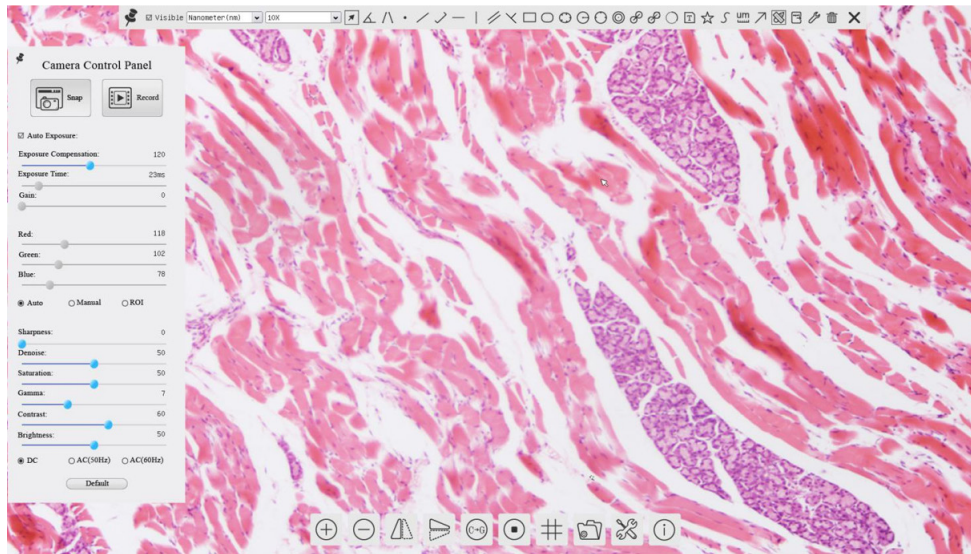




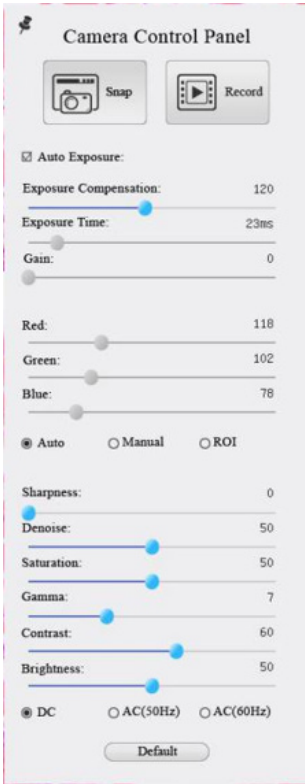
Figure 25 - Camera Control User Interface

### Notes:

1. When users move mouse cursor to the bottom of the video window, the *Camera Control Toolbar* 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*.

## 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.

Camera Control Panel	Function	Description
 <p>The screenshot shows the Camera Control Panel with the following settings: Snap and Record buttons; Auto Exposure checked; Exposure Compensation at 120; Exposure Time at 23ms; Gain at 0; Red at 118; Green at 102; Blue at 78; Auto selected; Sharpness at 0; Denoise at 50; Saturation at 50; Gamma at 7; Contrast at 60; Brightness at 50; DC selected; and a Default button.</p>	Snap	Capture image and save it to the USB flash disc
	Record	Record video and save it to the USB flash disc
	Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time according to the value of exposure compensation
	Exposure Compensation	Available when Auto Exposure is selected. Slide left or right to adjust the exposure compensation according to the current video brightness to get the correct brightness value.
	Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
	Gain	Adjust Gain to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
	Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
	Green	Green is base for reference and cannot be adjusted
	Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
	Auto White Balance	Continuous adjustment of the White Balance according to the monitor display
	Manual White Balance	Adjust the Red or Blue values to set the proper White Balance
	ROI White Balance	White Balance can be adjusted when the ROI region is changed according to content inside the ROI region
	Sharpness	Adjust Sharpness level of the video window
	Denoise	Adjust Noise level of the video window
	Saturation	Adjust Saturation level of the video window
	Gamma	Adjust Gamma level of the video. Slide to the right side to increase gamma and to the left to decrease gamma
	Contrast	Adjust Contrast level of the video. Slide to the right side to increase contrast and to the left to decrease contrast
	DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
	AC(50HZ)	Check AC(50HZ) to eliminate flickering "strap" caused by 50Hz illumination
	AC(60HZ)	Check AC(60HZ) to eliminate flickering "strap" caused by 60Hz illumination
	Default	Set all the settings in the Camera Control Panel to default values

## 10.2 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 switch		Video Freeze
	Display Cross Line		Browse Images and Videos in the SD Card
	Settings		Check the Version of HDMILITE

The Settings is relatively more complicated than the other functions. Here is more information about it:

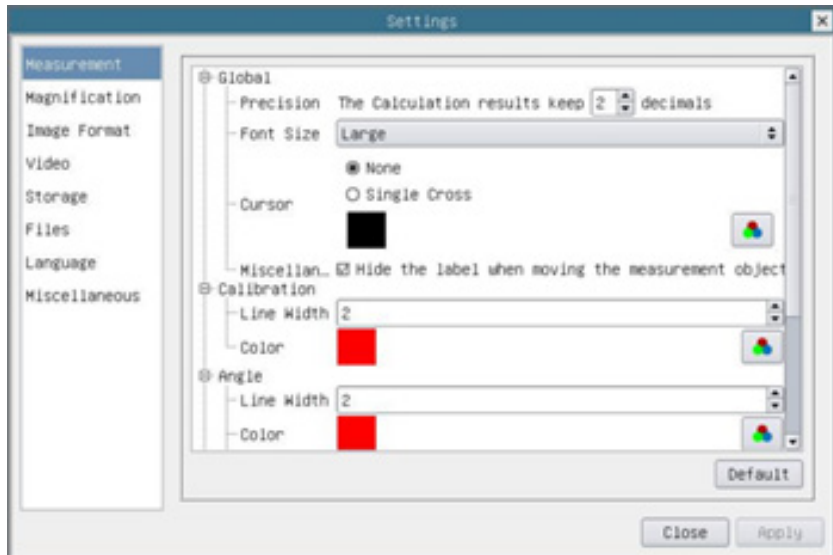


Figure 26 - Measurement Settings Page

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

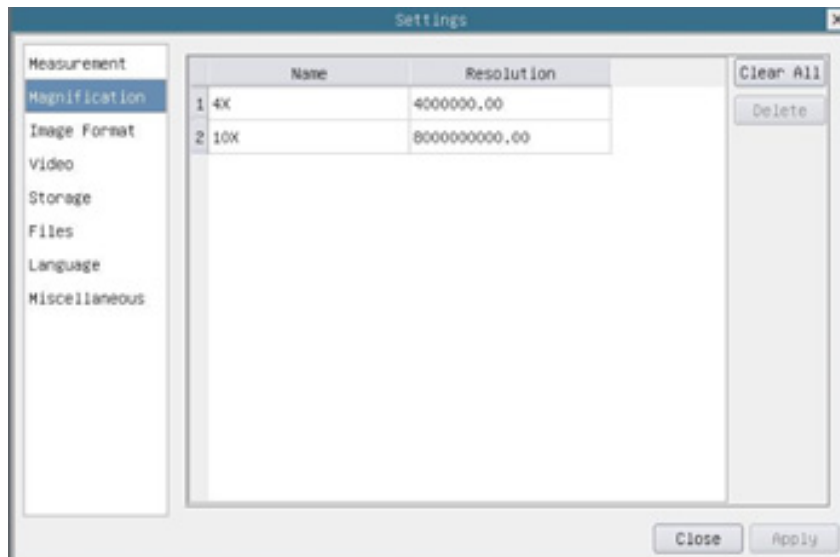


Figure 27 - Magnification Settings Page

<b>Name:</b>	Names such as 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 microscope zoom knob
<b>Resolution:</b>	Pixels per meter. Devices like microscopes have high resolution value
<b>Clear All:</b>	Click the Clear All button will clear the calibrated magnifications and resolutions
<b>Delete:</b>	Click Delete to delete the selected item for specific resolution

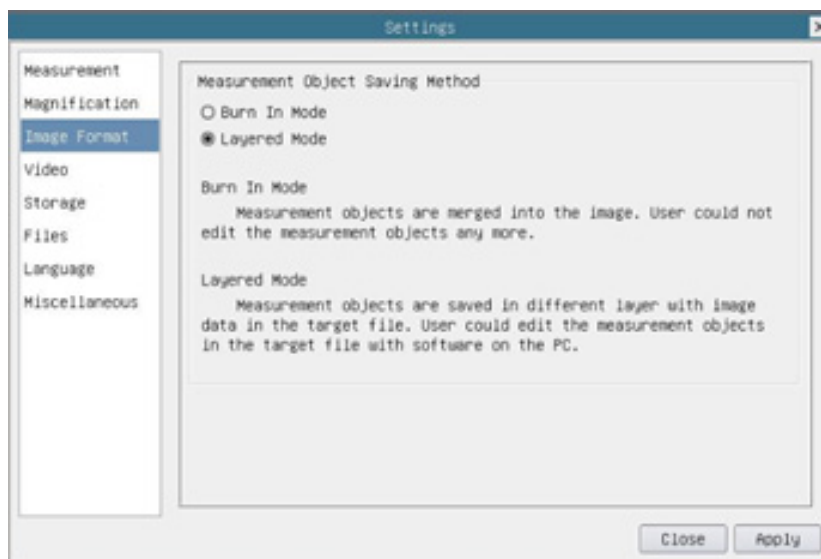


Figure 28 - Image Format Page

<b>Measurement Object Save Method:</b>	<b>Burn in Mode</b>	The measurement objects are merged into the current image. User could not edit the measurement objects anymore. This mode is not reversible
	<b>Layered Mode</b>	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 reversible

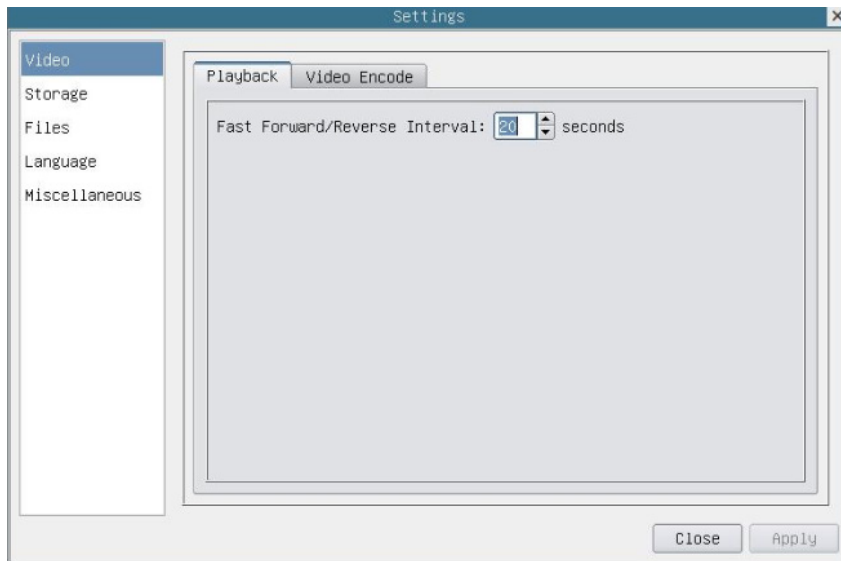


Figure 29 - Video Settings - Playback Page

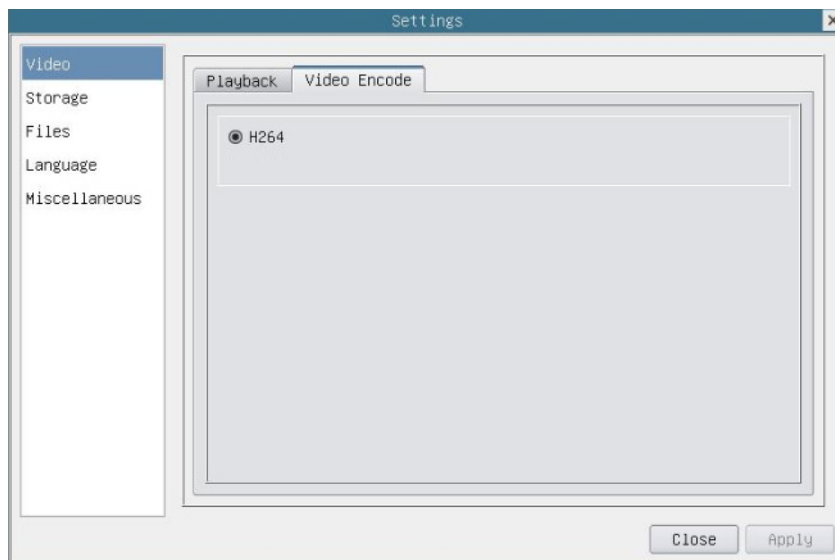


Figure 30 - Video Settings - Video Encode Page

<i>Fast Forward/Reverse Interval</i>	The time interval of the playback of video files
<i>Video Encode</i>	H264: The encoding format of the video files is H264 format

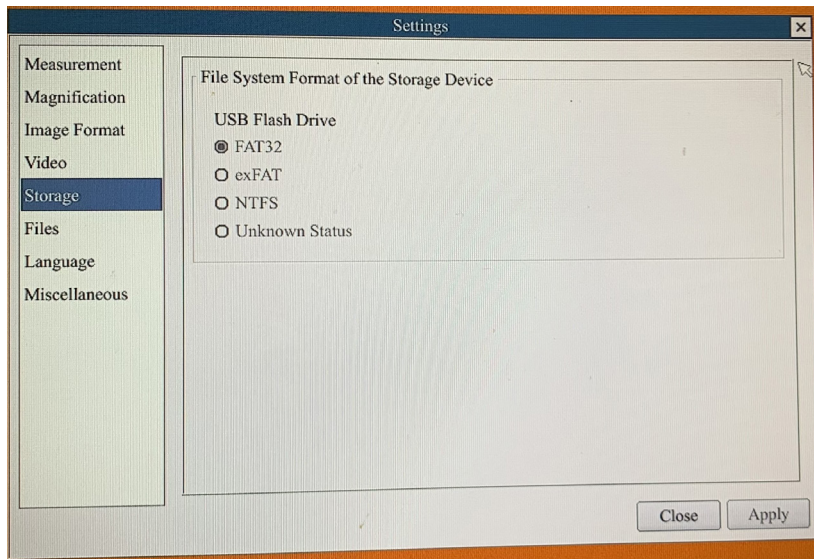


Figure 31 - USB Flash Disc Settings Page

	List the file system format of the current storage device	
<i>File System Format of the Storage Device</i>	<i>FAT32:</i>	The file system is FAT32. The maximum file size of single file is 4GB
	<i>exFAT:</i>	The file system is exFAT. The maximum file size of single file is 4GB
	<i>NTFS:</i>	The file system is NTFS. The maximum file size of single file is 4GB
	Use PC to format the USB Drive and switch between FAT32, exFAT and NTFS	
	<i>Unknown Status:</i>	USB Drive not detected or the file system is not identified

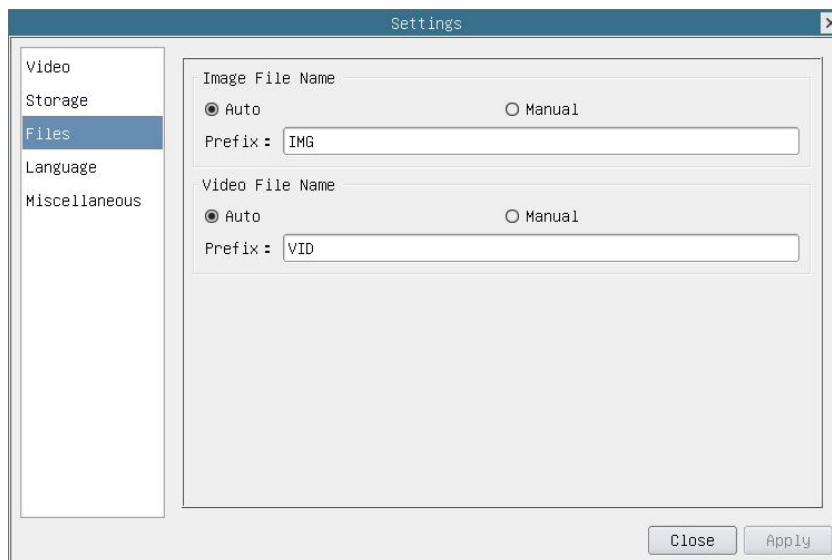


Figure 32 - File Settings Page

<i>Image File Name</i>	<i>Auto:</i>	The image files will be saved automatically with the specified prefix
	<i>Manual:</i>	Users has to specify the 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>	Users has to specify the video file name before video recording
<i>Note:</i>	The maximum video file size is 4GB. Multiple video files may be generated automatically during long time video recording	

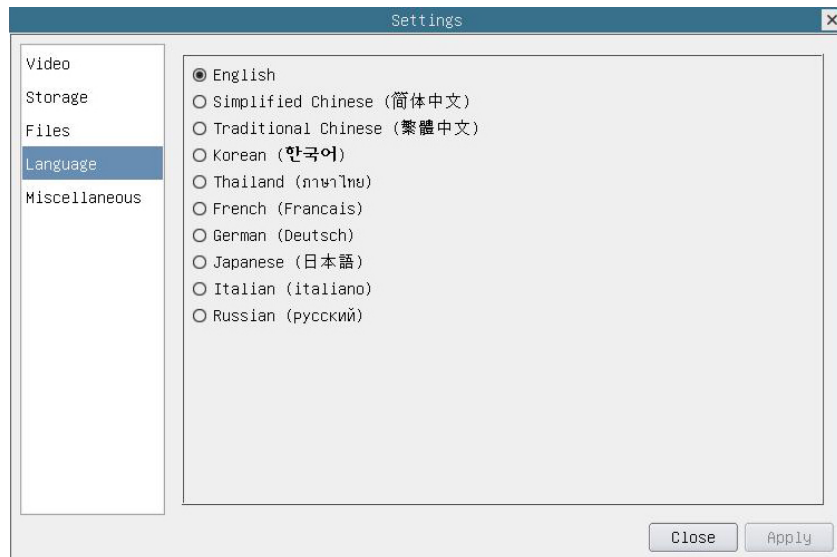


Figure 33 - Language Settings Page

<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

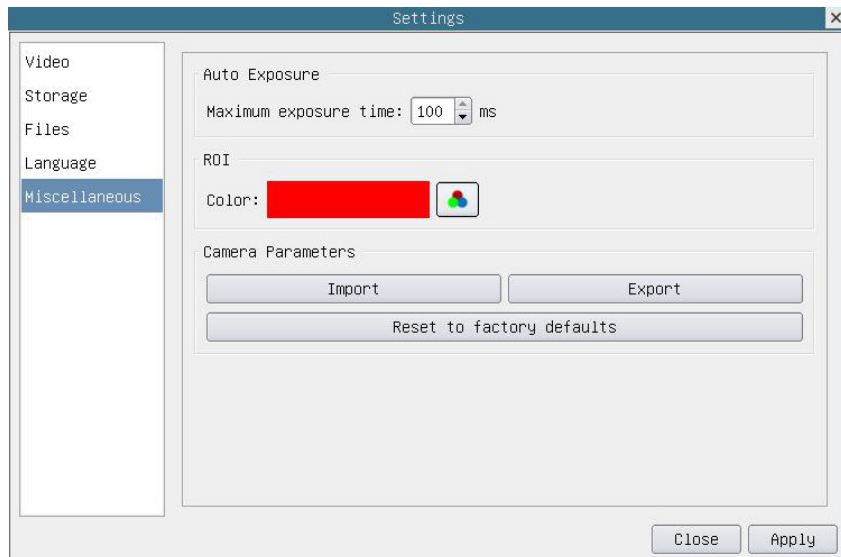


Figure 34 - Miscellaneous Settings Page

<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 ROI rectangle line color
<i>Camera Parameters Import</i>	Import the Camera Parameters from the SD card to use the previously exported Camera Parameters
<i>Camera Parameters Export</i>	Export the Camera Parameters to the SD card to use the previously imported Camera Parameters
<i>Reset to factory defaults</i>	Restore camera parameters to its factory status

### 10.3 The Measurement Toolbar

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

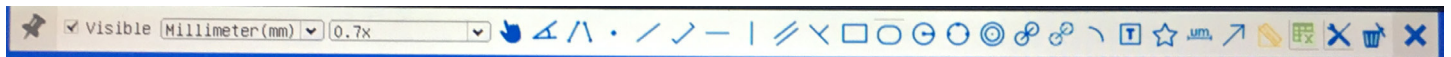










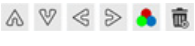





Figure 35 - The Measurement Toolbar

Icon	Function
	Float/ Fix switch of the Measurement Toolbar
<input checked="" type="checkbox"/> Visible	Define measuring object in Show up/ Hide mode
<input type="text" value="Nanometer (nm)"/>	Select the desired Measurement Unit
<input type="text" value="4x"/>	Choose the same Magnification as the microscope to ensure accuracy of measurement result when measurement unit is not in Pixel units
	Object Select
	Angle
	4 Points angle
	Point
	Arbitrary Line
	3 points Line
	Horizontal Line
	Vertical Line
	Vertical 3 points line
	Parallel
	Rectangle
	Ellipse
	5 Points Ellipse
	Circle
	3 points Circle
	Annulus
	Two Circles and Center Distance
	3 Points Circle and Center Distance
	Arc


	Text
	Polygon
	Curve
	Scale Bar
	Arrow
	Execute Calibration to determine the corresponding relation between magnification and resolution, this will establish the corresponding relationship between measurement unit and the sensor pixel size. Calibration needs to be done with the help of a micrometer. For detailed steps of carrying out calibration please refer to chapter 8.4
	Delete all the measurement objects
	Measurement Setup
	Export measurement information to a CSV file (*.csv)
	Exit from Measurement mode
	When the measurement ends, left-click on a single measuring object and the Object Location & Properties Control Bar 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 Move Left, Move Right, Move Up, Move Down, Color Adjustment and Delete

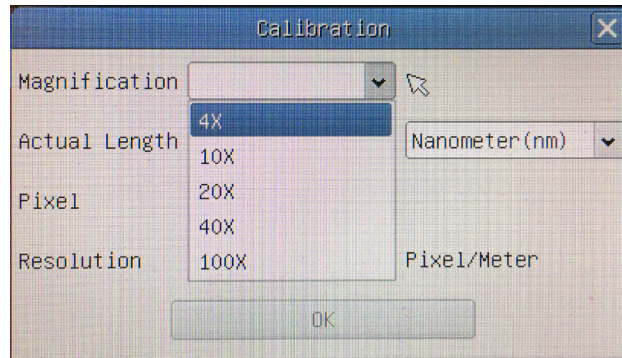
Notes:

1. When user left-clicks *Display/Hide* 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 moving mouse cursor to the left side of the video window. Only when users left click the  button on the *Measurement Toolbar* to exit from the measurement mode they will be able to doing other operations in the *Camera Control Panel* or the *Synthesis Camera Control Toolbar*.
2. When a specific *Measurement Object* 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.

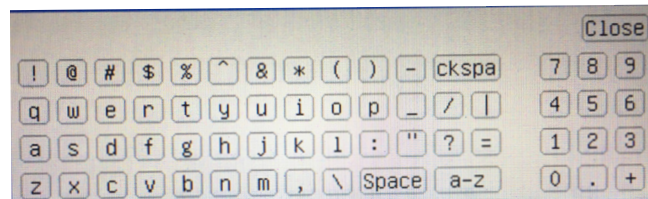
## 10.4 Camera calibration

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.

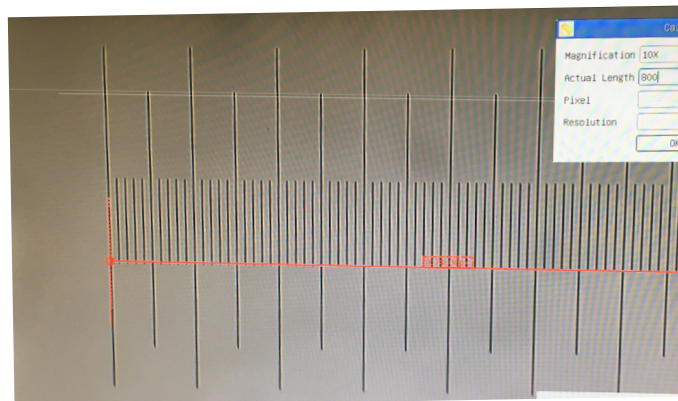
1. Insert the objective with the lowest magnification available and put the stage micrometer on the stage.
2. Click on the "Calibrate"  button in the *Measurement toolbar*.
  - The following dialog box appears:



3. 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.
4. 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.



5. 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).
6. Set the desired unit (micrometer, millimeter or nanometer) in the *Calibration* dialog box.
7. 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 13). One is 1mm/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  $\mu\text{m}$ .
8. 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.
9. Repeat the same procedure for each magnification available in your microscope.

## 11. C-WH5 Basic features

C-WH5 is a multiple interfaces (HDMI + WiFi + SD card) CMOS camera. HDMI and WiFi 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.

In the WiFi interface, connect the WiFi adapter to the camera's USB port. The camera generates a WiFi signal that is recognized by a computer with a WLAN connection. The camera can be managed via a PC using the ProView software. With ProView, you can control the camera, process video and images in the same way as with all other cameras in the OPTIKA series. Managing the camera via a mobile device requires an App to be downloaded on your device, allowing multiple users to view and capture images from the camera.

The C-WH5's basic features are as follows:

For HDMI output:

- C-mount camera with Sony high sensitivity CMOS sensor.
- Resolution 2MP (1080p).
- HDMI output.
- Built-in mouse control.
- Built-in image capture & video record to SD card.
- Built-in camera control panel, including exposure (manual/auto) / gain, white balance (lockable), color adjustment, sharpness control.
- Built-in toolbar for measurement.
- Built-in toolbar including zoom, mirror, comparison, freeze, cross, browser function.
- Built-in image & video browsing, display & play.
- Real time clock (RTC).

For WiFi output:

- Ultra-Fine color engine with perfect color reproduction capability.
- Resolution 5MP.
- With advanced video & image processing application ProView, which including professional image processing such as 2D measurement, HDR, image stitching, EDF (Extended Depth of Focus), image segmentation & count, image stacking, color composite and denoising.
- Supports standard UVC protocol for Windows.

### 11.1 Quick Instructions for C-WH5 camera

Before turning on the camera, please connect the standard C-mount camera to the camera adapter and insert it into the microscope's trinocular port.



Figure 36 - C-WH5 Rear Panel

- |                                |                 |
|--------------------------------|-----------------|
| ① HDMI port                    | ④ SD card slot  |
| ② USB mouse/ WiFi adapter port | ⑤ ON-OFF button |
| ③ Power supply plug            | ⑥ LED indicator |

---

### 11.1.1 WiFi mode

In WLAN (WiFi) mode, the camera can be used either via PC or IOS / Android mobile device (tablet or phone).

In case of use via PC:

- For Windows user (Windows 7/8/10 [32/64 bit]), use ProView.
  - For Mac OS and Linux user (Mac OS 10.10 or above or Linux distributions with kernel 2.6.27 or higher), use LiteView.
- The PC should be a WLAN enabled one.

In the case of use via mobile device (tablet or phone), the Optika Mobile View App is used, which can be downloaded from the OPTIKA web site (Android) or App store (IOS).

#### Use with PC

1. Connect the 12V/1A power cable to the “DC12V” connector ③ to power the camera.
  - The LED indicator ⑥ will turn red.
2. Connect the provided WiFi adapter to the “WiFi/USB Mouse” port ②.
3. Press the “ON/OFF” button ⑤ to turn on the camera.
  - The LED indicator ⑥ will turn blue.
4. Start the computer (equipped with WiFi connection) and in the “WiFi” settings of the computer select **C-WH5-xxxxx**.
  - The password for connecting the camera is “12345678”.
5. Start the ProView software, activate C-WH5 by clicking the camera name in the Camera List. For more details, refer to the ProView instruction manual.

**NOTE: The maximum number of users who can connect simultaneously is limited to 3. This is to ensure that the camera does not loose speed when many users are connected simultaneously. When 3 users are connected, the camera will not allow a fourth user to connect.**

#### Use with mobile device

1. Plug 12V/1A power adapter into “DC12V” slot ③ to supply power for the camera.
  - The LED Indicator ⑥ will turn into red.
2. Press “ON/OFF” Button ⑤ to turn on the camera.
  - The LED indicator will turn into blue.
3. Connect the provided WiFi adapter to the “WiFi/USB Mouse” port ②.
4. In the “Settings” of your device select the WiFi device **C-WH5-xxxxx**.
  - The password for connecting the camera is “12345678”.
5. Launch the Optika Mobile View App.
6. Manage the camera using the App to control all function.

### 11.1.2 HDMI mode

1. Plug the HDMI cable into the “HDMI” port ① to connect the C-WH5 camera to HDMI display.
2. Plug a USB mouse into “USB Mouse” port ② to get control of the camera by using HDMIPRO built-in software.
3. Plug 12V/1A power adapter into “DC12V” slot ③ to supply power for the camera.
  - The LED Indicator ⑥ will turn into red.
4. Insert SD card into “SD” Card slot ④ for saving captured images and recorded video.
5. Press “ON/OFF” Button ⑤ to turn on the camera.
  - The LED indicator ⑥ 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 12.1 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 etc. can be achieved. Please refer to 12.2 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 12.3 for details. The measurement data can be output with \*.CSV format.

## 12. C-WH5 User Interface (UI) and Its Functions

The C-WH5 UI shown in Fig. 37 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.

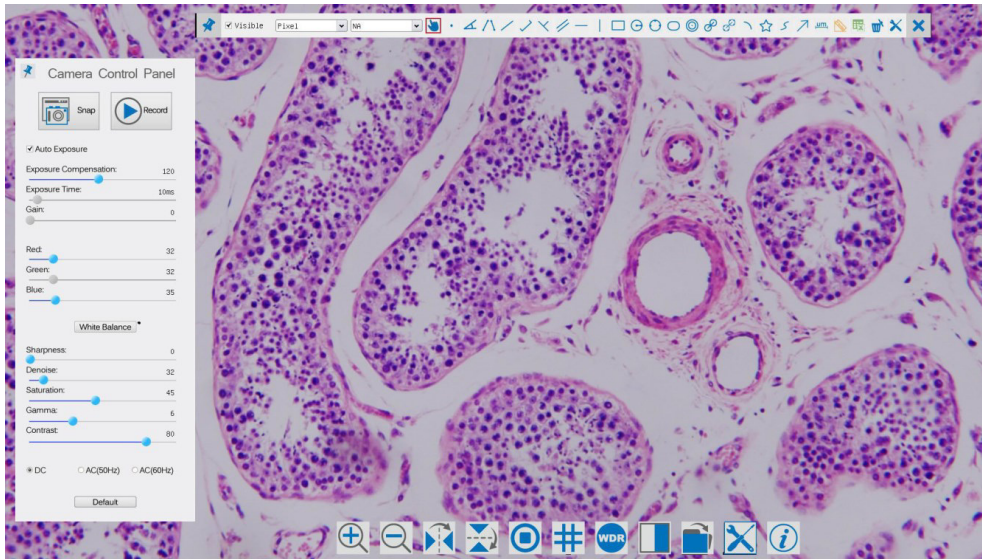





Figure 37 - Camera Control User Interface

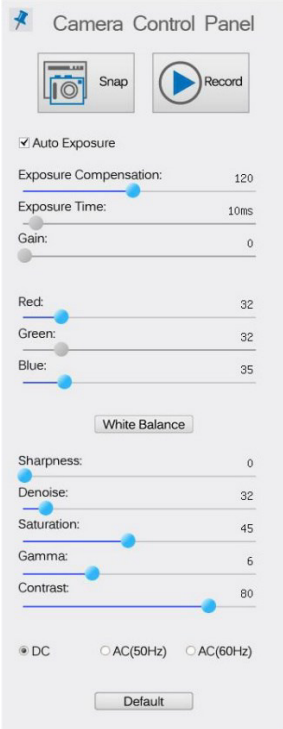
### Notes:

1. When users move mouse cursor to the left side of the video window, the *Camera Control Panel* will pop up automatically.
2. When user moves mouse cursor to the bottom of the video window, the *Camera Control Toolbar* will pop up automatically.
3. 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 *Synthesis Camera Control Toolbar*. During the measuring process, when a specific measuring object is selected an *Object Location & Attributes Control Bar*  will appear for changing specific location and properties of the selected objects.












## 12.1 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 will the *Camera Control Panel* pop up by moving mouse cursor to the left side of the video window).

Left-clicking button  to enable *Display / Auto Hide* switch of the *Camera Control Panel*.

Control Panel	Function	Description
	Snap	Capture image from the current video window
	Record	Record video from the current video window
	Auto Exposure	When Auto Exposure is checked, the system will automatically adjust exposure time according to the value of exposure compensation
	Exposure Compensation	Available when Auto Exposure is selected. Slide left or right to adjust the exposure compensation according to the current video brightness to get the correct brightness value.
	Exposure Time	Available when Auto Exposure is unchecked. Slide to left or right to reduce or increase exposure time, adjusting brightness of the video
	Gain	Adjust Gain to reduce or increase brightness of video. The Noise will be reduced or increased accordingly
	Red	Slide to left or right to decrease or increase the proportion of Red in RGB on video
	Green	Green is base for reference and cannot be adjusted
	Blue	Slide to left or right to decrease or increase the proportion of Blue in RGB on the video
	White Balance	Adjusting the White Balance according to the monitor display
	Sharpness	Adjust Sharpness level of the video window
	Denoise	Adjust Noise level of the video window
	Saturation	Adjust Saturation level of the video window
	Gamma	Adjust Gamma level of the video. Slide to the right side to increase gamma and to the left to decrease gamma
	Contrast	Adjust Contrast level of the video. Slide to the right side to increase contrast and to the left to decrease contrast
	DC	For DC illumination, there will be no fluctuation in light source so no need for compensating light flickering
	AC(50HZ)	Check AC(50HZ) to eliminate flickering “strap” caused by 50Hz illumination
	AC(60HZ)	Check AC(60HZ) to eliminate flickering “strap” caused by 60Hz illumination
	Default	Set all the settings in the Camera Control Panel to default values

## 12.2 Icons and Functions of the Camera Control Toolbar

Icon	Function	Icon	Function
	Zoom In the Video Window		Zoom Out the Video Window
	Vertical Flip		Horizontal Flip
	Video Freeze		Display Cross Line
	Enable Wide Dynamic Range mode		Compare Image with the current video
	Browse Images and Videos in the SD Card		Settings
	Informations on SW version		

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

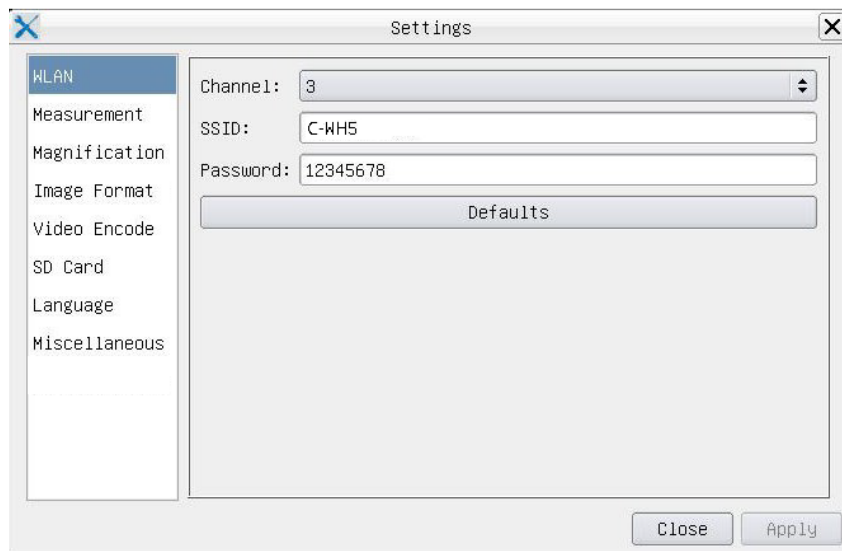


Figure 38 - WiFi Settings Page

<i>Channel:</i>	Wireless communication channel, is a data transmission channel with wireless signals as transmission media
<i>SSID:</i>	Camera name sent by WiFi adapter
<i>Password:</i>	WiFi password. Default is 12345678

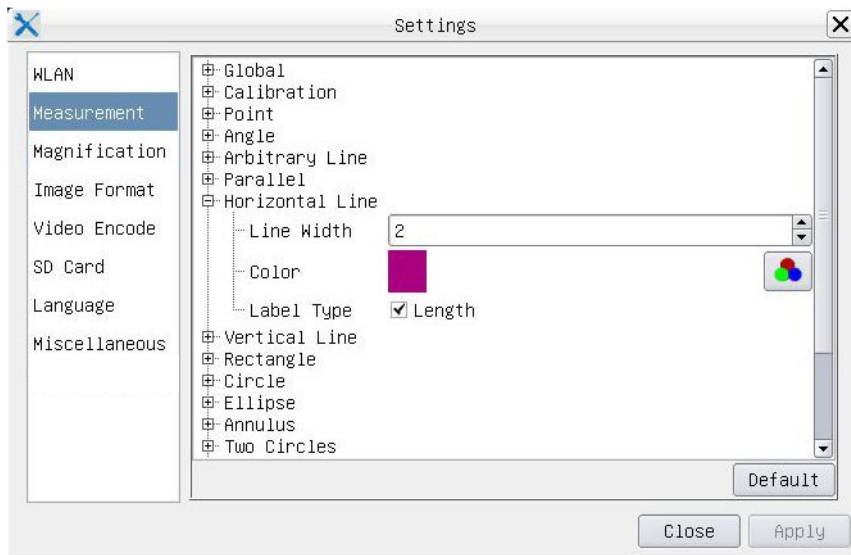



Figure 39 - Measurement Settings Page

<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				

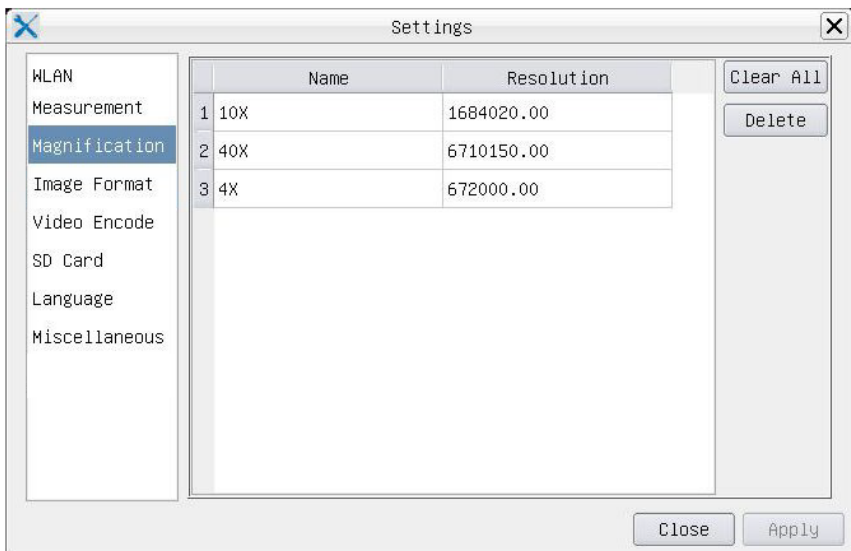


Figure 40 - Magnification Settings Page

<i>Name:</i>	Names such as 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 microscope 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

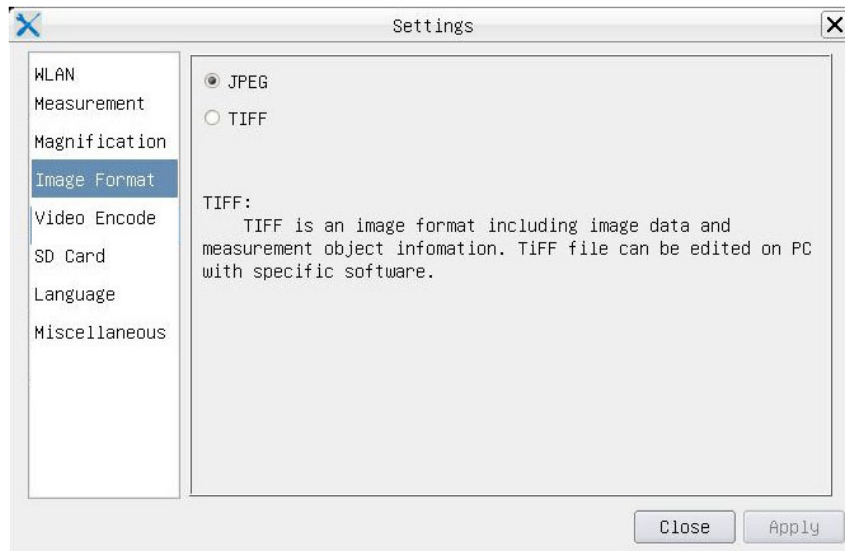


Figure 41 - Image Format Settings Page

<i>JPEG</i>	The JPEG file can achieve a very high compression rate and display very rich and vivid images by removing redundant images and color data. In other words, you can get better image quality with minimal disk space. If measuring objects are available, they are burned in the image and the measurement cannot be changed
<i>TIFF</i>	TIFF is an image format that can include both the image data and the measurement object. The measurement objects are saved separately from the image data and can be edited later with specific software

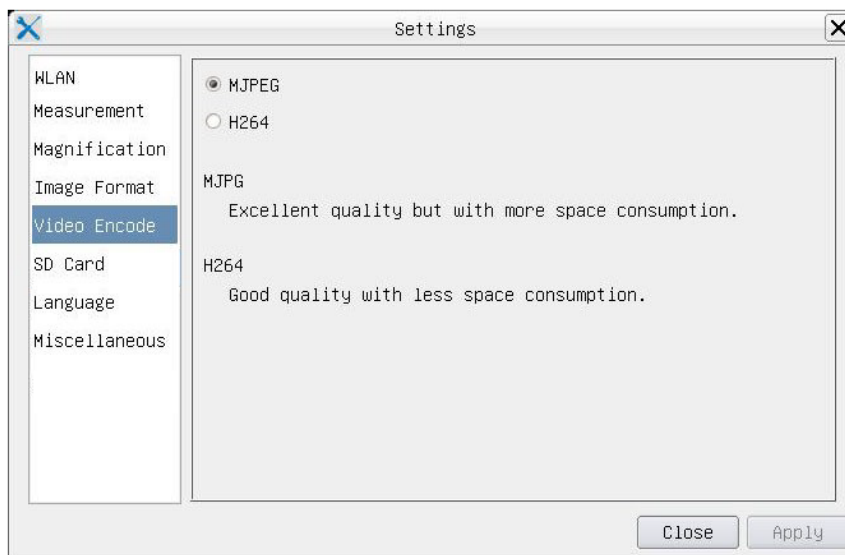


Figure 42 - Video Encode Settings Page

<i>MJPEG</i>	Codec format for video is MJPEG. Excellent quality but with more space consumption than H264
<i>H264</i>	Codec format for video is H264. Good quality with less space consumption

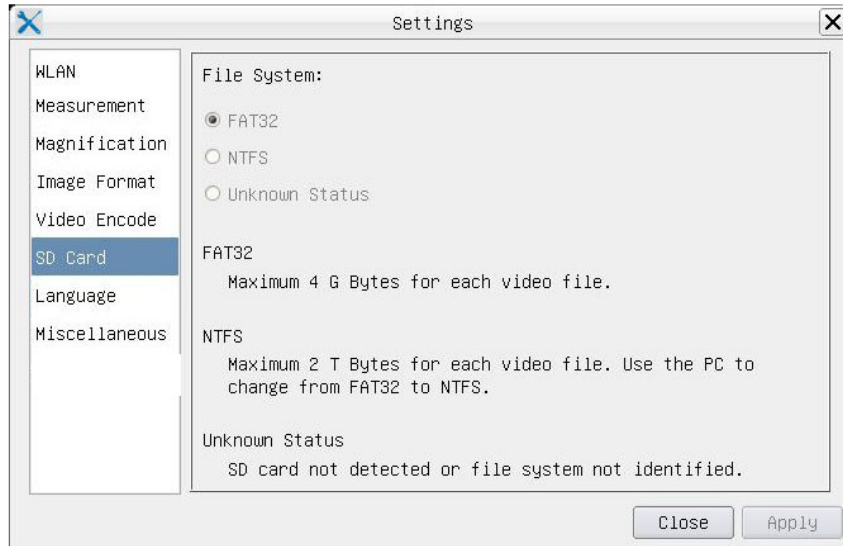


Figure 43 - SD Card Settings Page

<i>File System</i>	<i>FAT32:</i>	The file system of SD card is FAT32. 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 2TB
	Use PC to format the SD cards and switch between FAT32 and NTFS	
	<i>Unknown Status:</i>	SD card not detected or the file system is not identified

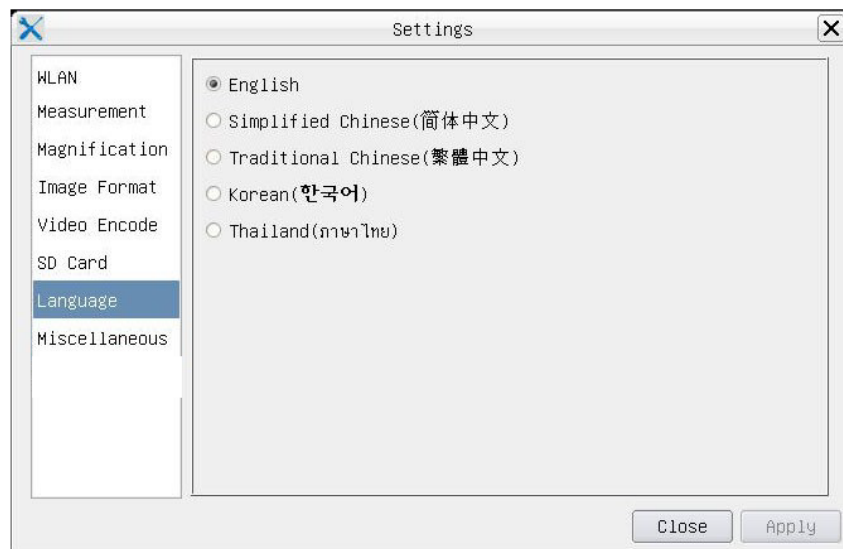


Figure 44 - Language Selection Settings Page

<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

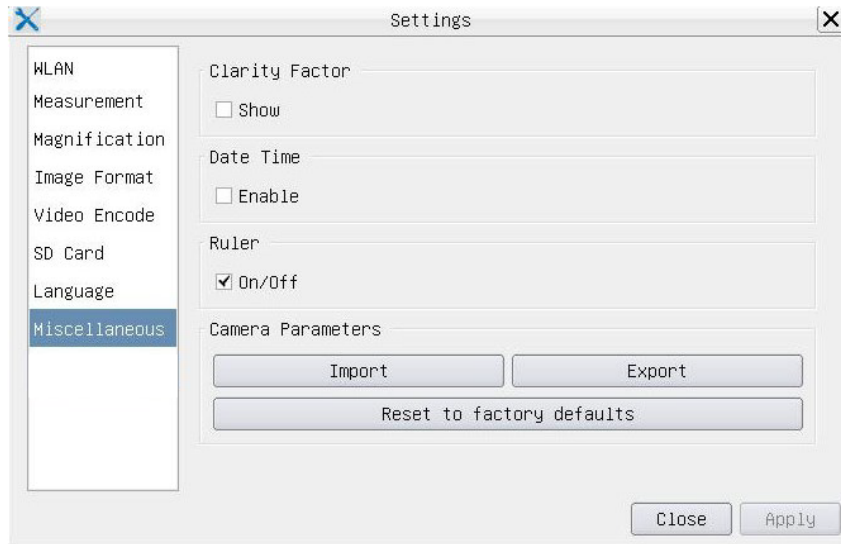


Figure 45 - Miscellaneous Settings Page

<i>Clarity Factor</i>	The Clarity Factor informs if the sample is in good focus state or not. The larger the Clarity Factor, the better the focus of the sample. Enable <i>Show</i> to see if the video is fully focused or not
<i>Date Time</i>	For cameras without RTC (Real Time Clock) configuration, users can configure the system date after installation of the camera, which is not saved because there is no built-in RTC
<i>Ruler (On/Off)</i>	Enable to show the Ruler on the video window
<i>Import</i>	Import parameter settings saved from SD card
<i>Export</i>	Export current camera parameters to SD card for later use
<i>Reset to factory defaults</i>	Reset camera parameters to factory conditions










### 12.3 The Measurement Toolbar

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



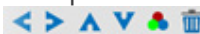


Figure 46 - The Measurement Toolbar

Icon	Function
	Float/ Fix switch of the Measurement Toolbar
<input checked="" type="checkbox"/> Visible	Define measuring object in Show up/ Hide mode
Nanometer (nm)	Select the desired Measurement Unit
4x	Choose the same Magnification as the microscope to ensure accuracy of measurement result when measurement unit is not in Pixel units
	Object Select
	Point
	Angle
	4 points angle
	Arbitrary Line
	3 points line
	Vertical 3 points line
	Parallel
	Horizontal Line
	Vertical Line
	Rectangle
	Circle
	3 points circle
	Ellipse
	Annulus
	Two Circles and Center Distance
	3 points circle and e Center Distance
	Arc
	Polygon


	Curve
	Arrow
	Ruler
	Make Calibration to determine the corresponding relation between magnification and resolution, this will establish the corresponding relationship between measurement unit and the sensor pixel size. Calibration needs to be done with the help of a micrometer. For detailed steps of carrying out calibration please refer to chapter 10.4
	Export the measurement information to CSV file(*.csv)
	Delete All the Measurement Objects
	Settings
	Exit from Current Measurement Mode
	When the measurement ends, left-click on a single measuring object and the Object Location & Properties Control Bar will show up. The icons on the control bar mean <i>Move Left</i> , <i>Move Right</i> , <i>Move Up</i> , <i>Move Down</i> , <i>Color Adjustment</i> and <i>Delete</i>

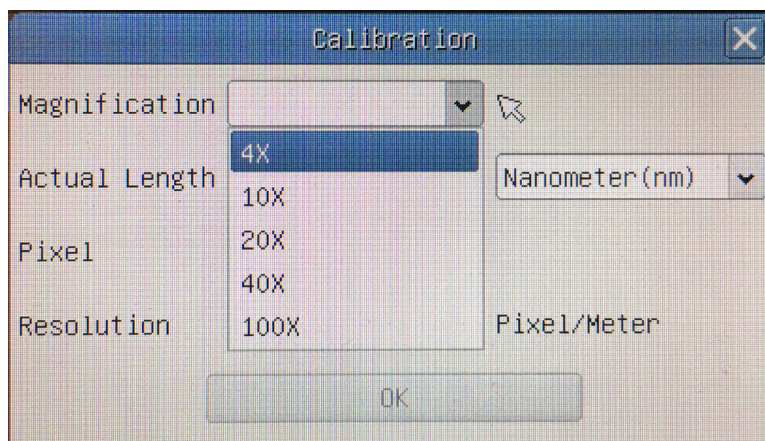
Note:

1. When user left-clicks *Display/Hide* 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 moving mouse cursor to the left side of the video window. Only when users left click the  button on the *Measurement Toolbar* to exit from the measurement mode they will be able to doing other operations in the *Camera Control Panel* or the *Synthesis Camera Control Toolbar*.
2. When a specific measuring object is selected during the measuring process, the *Object Location & Attributes Control Bar*  will appear for changing the object location and properties of the selected objects.

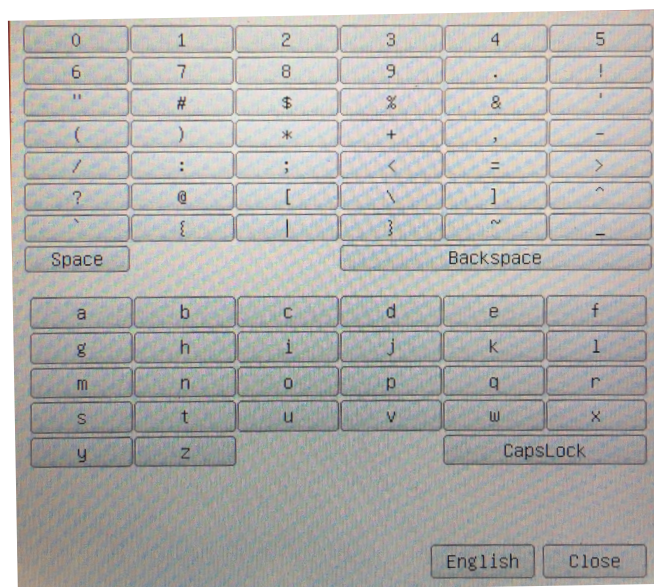
## 12.4 Camera calibration

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.

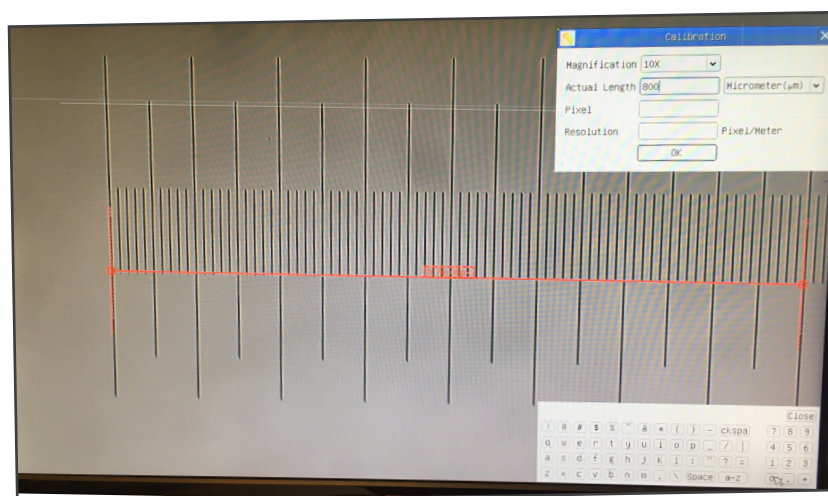
1. Insert the objective with the lowest magnification available and put the stage micrometer on the stage.
2. Click on the “*Calibrate*”  button in the *Measurement toolbar*.
  - The following dialog box appears:



3. 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.
4. 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.

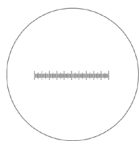


5. Align the two ends of the red line with the ruler scale (try to use as many notches as possible to keep the calibration accuracy).
6. Set the desired unit (micrometer, millimeter or nanometer) in the *Calibration* dialog box.
7. Insert the length of the drawn line in the *Actual Length* field (using the same procedure described above).
  - Micrometric slide has two rulers (see chapter 13). 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  $\mu\text{m}$ .
8. 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.
9. Repeat the same procedure for each magnification available in your microscope.

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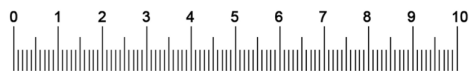
### 13. Micrometric Slide M-005

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



1 DIV=0.01mm

**For biological microscopes calibration**



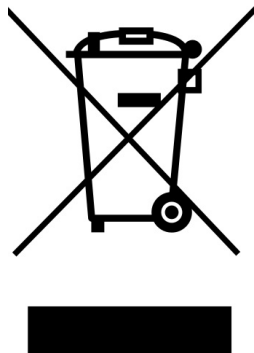
1 DIV=0.1mm

**For stereo microscopes 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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