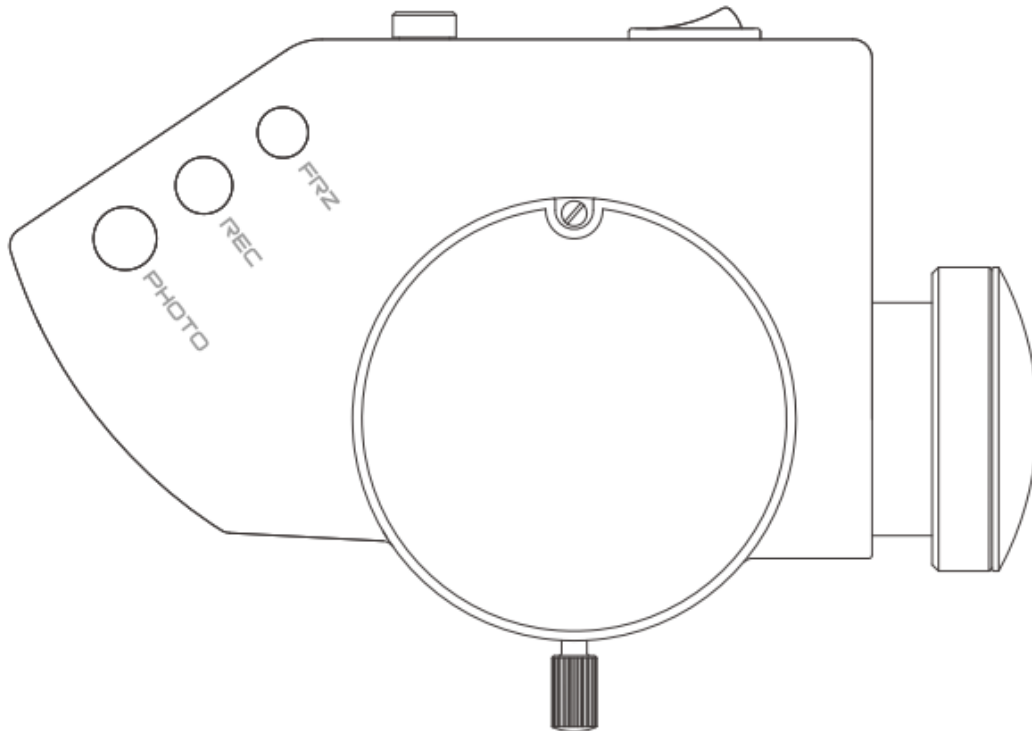


Ryeco Dental Cam02 for Dental- & Surgical Microscope **CE**

User Manual

(Please read the instruction carefully before using it)



www.ryfag.ch Ryf Ryeco Dental-CAM-02

Version: 02

2019-02-06

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Safety Caution

We would like to inform you about safety aspects which must be observed when handling this device. This chapter contains a summary of the most important information concerning matters relevant to instrument safety.

Dangerous symbols

The following safety information has been incorporated into the user manual. Please note this information and be particularly careful in these cases.



Warning label, which may refer to fatal injuries or severe injuries or moderately severe injuries if precaution safe not followed.



Warning label, which may refer to minor injuries and property damages if precautions are not followed.

Information symbol

Use the following information symbols in this user manual :

- Listing
- ✓ Prerequisite for an action
- Prompt for action
- Result of an action



Additional information and tips

Target Population

Users who operate surgical microscope should be sure to be able to have the use of surgical microscopy techniques. This user manual provide guidance for the users to provide product assembly, use and troubleshooting information. Users need to have the skills of operating a Dental microscope like many from Zeiss, Ryeco AM-2000, AM4000, AM 6000, AM5000 as well as many other brands, please ask a Sales person at Ryf Ltd.

Intended use

The Dental CAM02 is a kind of camera device that is used to match the surgical microscope. It provides an image output method for all kinds of operation microscope.

Normal use

The Dental CAM02 is required with use of surgical microscope, it can not get a good image output when it uses alone. The product also provides a beam splitter adaptor, with conventional function of beam splitter, through the interface with adaptor fitting assistant mirror and accessories. For disposal, please observe the instructions in this manual as well as the applicable legal regulations in your country.

Working Environment

- Ambient Temperature Range: -10°C - +50°C;
- Relative Humidity Range: 10% RH - 80% RH;
- Barometric Pressure Range: 500 hPa-1060 hPa;
- Power Supply: DC 5V/2.6A

Storage Environment

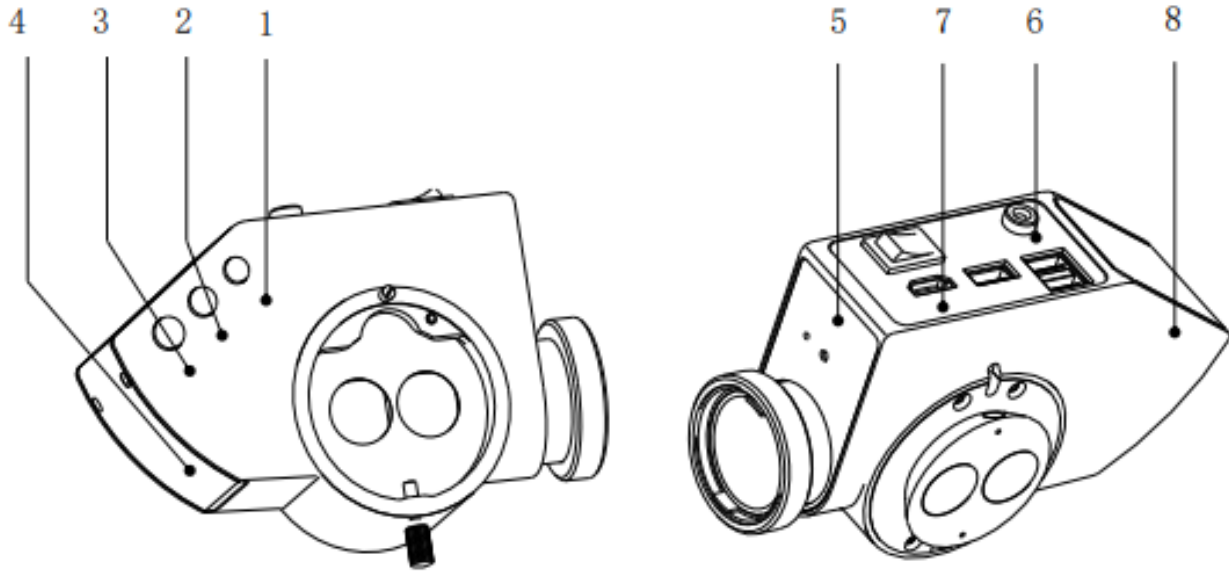
- Ambient Temperature Range: -5°C-+40°C
- Relative Humidity Range: <60% RH;
- Barometric Pressure Range: 500 hPa-1060 hPa

Safety Characteristic

- Supply Voltage: DC
- Classified by input fluid protection degree: IPX0;
- Max input power: 7.5W

The operator attention

- Please thoroughly familiarize yourself with the contents of the user manual before starting up the system. Also observe the user manuals for accessories and other system components.
- Please keep the user manual where it is easily accessible at all times for the persons operating the system.
- Please observe all symbols and labels attached to the device!
- Modifications and repairs of this device may only be performed by Ryf After Sales Service staff.
- Do not place any fluid-filled containers on top of the instrument. Make sure that no fluids can seep into the instrument.
- Please note that local legislation takes priority over the above-mentioned standard requirements. If you have any questions, please contact your local Ryeco dealer

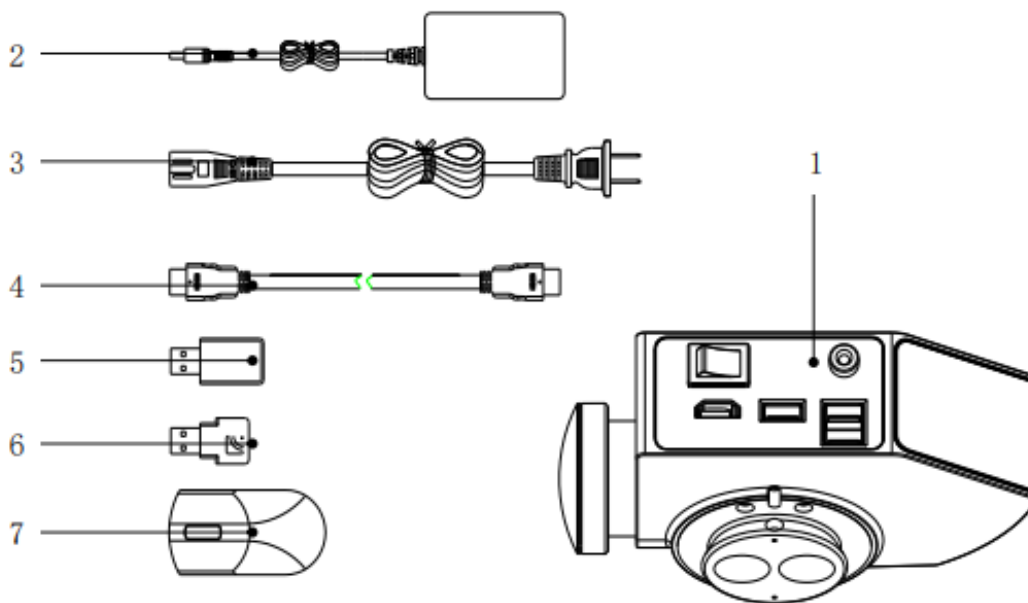


Product Features

- Compatible with the surgery microscope of suitable interface size
- Adopt Diagonal 1/2" SONY Image Sensor with high sensitivity and low noise
- Built-in Linux3.0 operation system --- internal ARM Cortex A9 @MAX. 930MHz
- HDMI interface 1080P 60FPS fully high definition real-time image output
- Support extended WIFI function, support WIFI image transmission (Use WINDOW system and Android system client terminal software)
- Built-in 32G storage, connect with external U-disk --- for taking JPEG image and recording MP4 format video
- The camera parameter can be set with mouse
- Photographing, video recording and image freezing functions are available with buttons
- The wireless remote control pedal is optional for photographing and video recording
- It can be directly with the use of the surgical microscope in conform interface size.
- One-channel optical splitter interface
- Wide Voltage Input: AC100-240V 50-60Hz
- The operation interface of the camera is concise with semi-transparent appearance
- With the function of selecting interested area (AOI)
- Built-in video zoom, flip function
- Built-in image and real-time video comparison function

Composition of the Ryeco “sandwich” Cam:

- 1 Main Unit
- 2 Power Adapter
- 3 Power Cable: According to the different specifications of the plug Euro- or Swiss Plugs are available
- 4 HDMI high definition video transmission cable: Long 5 meter
- 5 U Disc: Full version of the electronic manual, mobile phone (Android system) client and computer (Windows) client are stored in U disk memory.
- 6 WIFI hardware with USB interface
- 7 Wireless Mouse



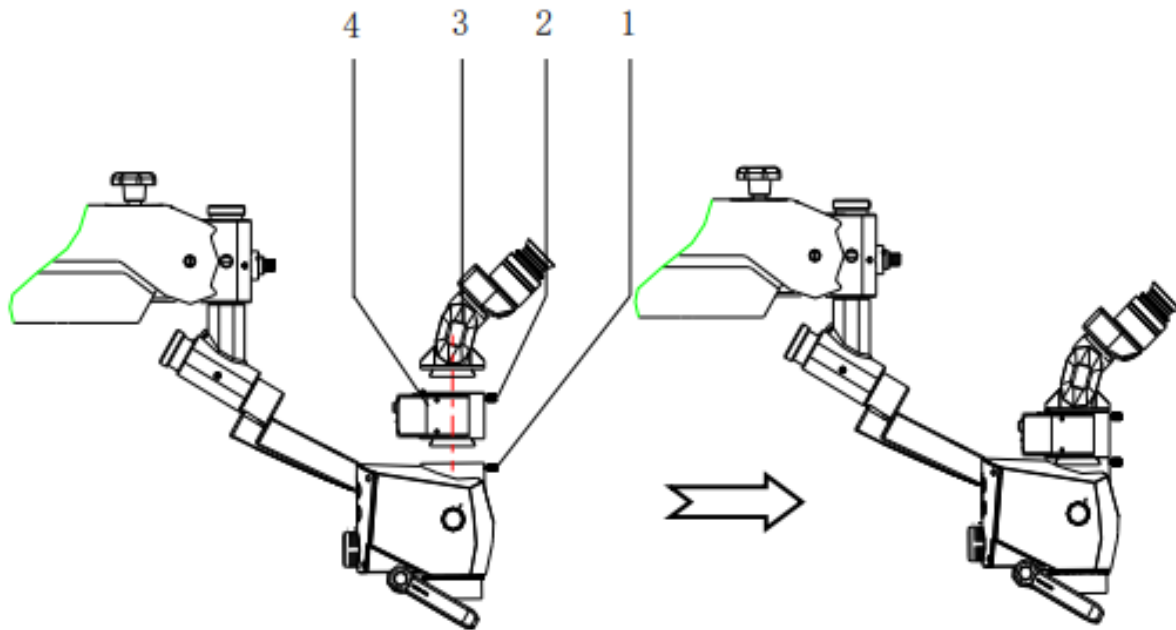
Main Technical Parameters

Technical Parameters		
Camera Features	Image Sensor	1/2 SONY CMOS with high sensitivity and low noise
	Output Interface	HDMI: 1
		USB2.0: 3
	Resolution	HD1080P 60FPS (16: 9)
	Store	Built-in 32G storage, connect with external U-disk Picture: JPG format, Video: MP4 format
	WIFI	Support extended WIFI function, support WIFI image transmission
	Power Supply	5V
Power Consumption	6W	
Physical Property	Weight	0.7kg
	Dimension	155*110*60
Optical	Camera optical splitter ratio	2:8 (Optical 5:5)
	Optical splitter interface ratio	2:8 (Optical 5:5)
Software	Video Setting	1080P, 720P
	Snap Setting	2M
	Base Functions	Freezing, Snap Image, Video Recording, Automatic Exposure, White Balance, Image Echo, Crosshairs
	Image Effects	Exposure Value, Best Brightness, Gain, Red Gain, Blue Gain, Saturation, Contrast, Sharpness, HDR
	Advance Functions	Horizontal Flip, Vertical Flip, Enlarge, Reduce, AOI, Image Contrast
	System Settings	In Camera/In U Disk, Auto Name/Manu Name, 中文 /English, Ruler Show/Ruler Hide, System Update, Restore Default, Export, Formatting, Version Information
	Measuring function	Ruler, Function: P2P、P2L、L2L、C2C、P2C、L2C、Angle、Arc、Circle、Rect、Polygon、Crease、Text、Del All、Color Settings、To Pictures、To Excel、Information.

Installation of the Ryeco Dental camera:

Risk of injury to the patient caused by camera or parts of the camera or microscope falling down!

- The consistence between the interface in this product and installation interface of microscope should be confirmed before assembly.
- After every change in configuration and before every use, make sure that the modules and accessories are securely locked in position. Make sure that all securing screws and locking screws are tightened!
- Never Install or remove the modules during a surgical procedure or above the patient!
- Unscrew the locked screws (1), take down binocular(3)
- Install the Ryeco Camera (4) on the top (sandwich-camera) of the Dental Microscope, screw the lock screws (1)
- Install binocular on the top of the Ryeco Dental camera (4), screw the lock screws (2)

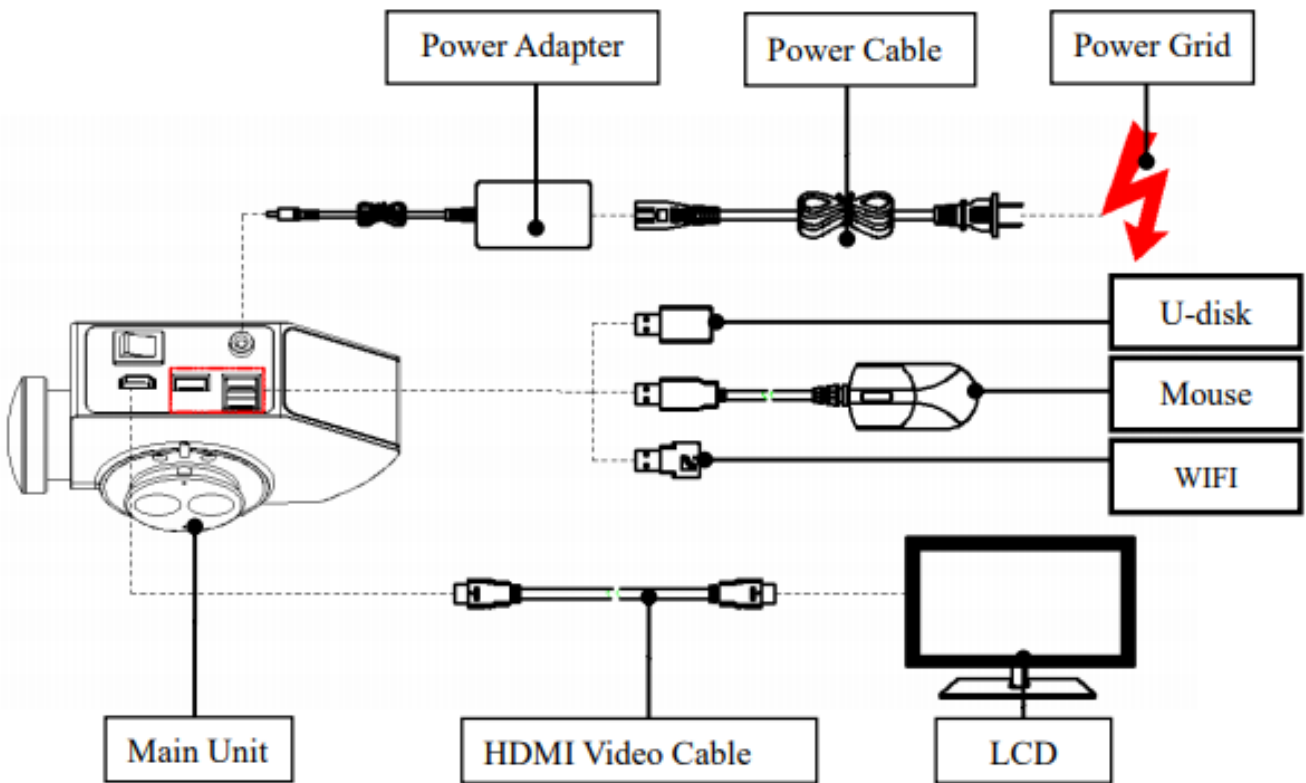


Please check the input channel of the HDMI video transmission line is in line with the display channel of the display, otherwise the display has no image output.

Connect the wires according to the Fig5 below:

Installation Confirmation

- Press the Power switch, observe if the Power indicator lights on, identify if power is supplied;
- Observe if the image displays on the LCD, identify if the high definition video cable is connected correctly.

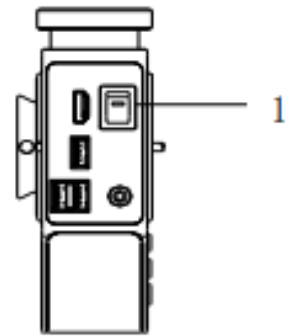


Powering the system up and down

- The power cable has been connected
- The HD video cable is connected

Press the Power switch (1)

- The system has been switched on if the green lamp in the power switch is light.
- Display Boot Interface on the monitor.

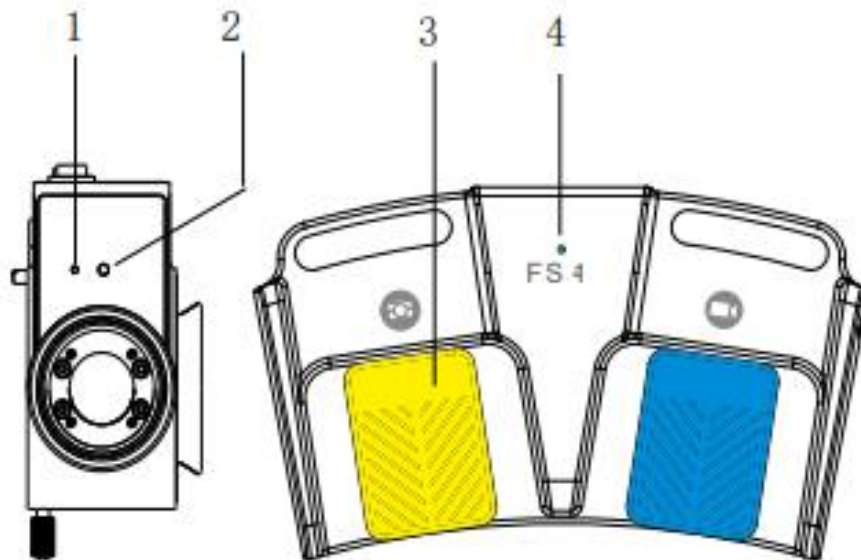


Wireless Remote Control Pairing

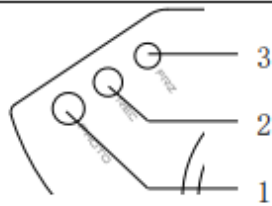
The wireless remote control has to be pared before leaving the factory. For pairing it again, please operate according to the following mode:

Wireless Foot Control Panel belongs to the selection of accessories Prerequisite condition

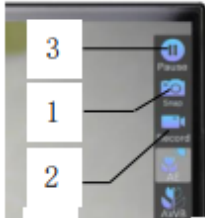
- Product is in a state of switched on
- Wireless Foot Control Panel is in a state of switched on
- Pairing: Under the On state, press the pairing button (1) of the wireless module with needle till the wireless pairing indicator (2) light on, then kick the photo button(3) 4 second of pedal switch, the indicator(4) of pedal switch light on and light off after 4 second, then indicator(2) (4) flashes 2 times, and lights off, finish pairing;



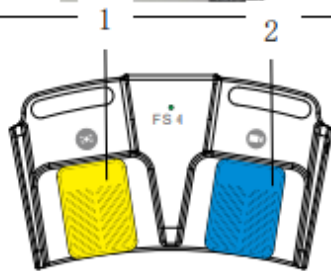
Photographing, Video recording and Freezing



- ◆ Press button(1) for photographing
- ◆ Press button(2) once to record video, press it again to exit video recording
- ◆ Press button(3) once for freezing the current display image, press it again to exit image freezing



- ◆ Press button(1) for photographing
- ◆ Press button(2) once to record video, press it again to exit video recording
- ◆ Press button(3) once for freezing the current display image, press it again to exit image freezing



- ◆ Press button(1) for photographing
- ◆ Press button(2) once to record video, press it again to exit video recording

Photographing, Video recording and Freezing Icon



Freezing Icon

- ◆ Once the picture in the camera enters into freezing status, it also will be shown that the pause preview icon located in the upper right corner in the display.



Photographing Icon

- ◆ Photograph icon is shown on the upper right corner located in the display during the process of photographing.



Video Recording Icon

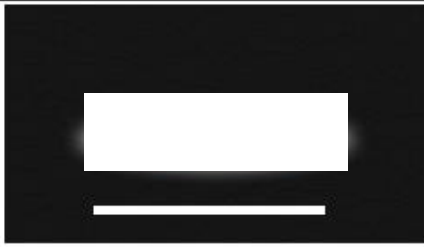
- ◆ Video icon is shown on the upper right corner located in the display during video recording.



- ◆ Video format is shown on the upper left corner located in the display during the video recording, round icon of video time, and of red flashing are to represent this format.

Camera Operating System Introduction

Boot Interface

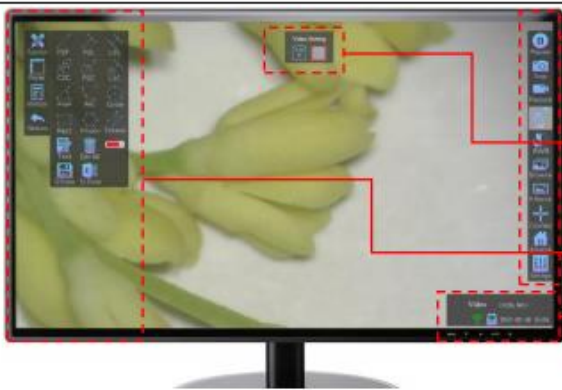


- ◆ The line cable has been connected
- ◆ The HD video cable has been connected

Press the Power Switch ON

- Display the Boot Interface as shown in left Fig, after working for a moment, the program will enter system.

System Interface Area Introduction




- Video Function Area: Pause, Snap, Record, AE, AWB, Browse, Effects, Crosshairs, Advance, Settings.
- Video Selection: Select video resolution (720P and 1080P).
- Functions of Measuring Area: The size of the observed object can be measured by setting the scale.
- State Function Area: Include status bar display/hidden, manage, WIFI working mode, Internal/External Memory state, System Time etc.

Operation Instructions on Video Function Area

Video Preview Switch



Click the "Pause" Preview icon

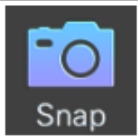
- The camera will enter into freezing state, it also will be shown that the pause preview icon  located in the upper right corner in the display, and video preview area will keep displaying the last image.



Click the "Play" Preview icon


- The camera returns to the video preview state.

Snap Image



- ✓ Under Video Mode

Click the "Snap" Image icon

- Photograph icon  is shown on the upper right corner located in the display during the process of photographing.
- One 1080P jpg image will be saved in the designated internal storage (or external storage) device, the saving position is the img folder in the root directory.

ⓘ The default image naming format is automatic naming, to transfer into independent naming, click the "Manu Name" in "System Setting". Please refer to page 26.

ⓘ The default current storage is internal storage, to save the image in the external storage, please connect the U-disk with it, after the U-disk is normally identified, click the "In U Disk" in "System Setting". Please refer to page 26.


ⓘ Please refer to page 38 for introduction to "Video Mode" and other modes.

Video Recording



- ✓ Under Video Mode

Click the "Record" icon

- During video recording process, Video icon  is shown on the right corner located in the display during video recording, the left upper of LCD displays the video recording format, video recording time a flashing round icon as show in left.

- To save the video with mp4 format in the video folder of the root directory in the designated storage device.



Camera is recording video



Click the "Pause" (Stop Video Recording) icon

➤ To finish recording video

ⓘ The naming rule for video recording file is the same as that of image


ⓘ When the remaining storage capacity is less than 5%, clicking on the video will prompt "No enough space left" and don't perform the video recording. If the video process recognizes that the storage capacity less than 5%, the ongoing video will automatically stop.

Automatic Exposure



✓ Under Video Mode

Click the "AE" icon

➤ The camera enters into the automatic exposure state, Automatic exposure icon  is shown on the upper right corner located in the display, under this state, the camera will automatically adjust the exposure value of the current image according to the environment, and ensure it meets the set brightness value.

Click it again.

➤ To exit the automatic exposure state

ⓘ The brightness value can be adjusted in the "Best Brightness" of "Image Effects", Please refer to page 20.

White Balance



✓ Under Video Mode

Click the "AWB" icon


➤ The video enters into the automatic white balance state, White balance icon  is shown on the upper right corner located in the display, and then stops white balance after reaching the suitable value and automatically exit white balance state.

Image Echo



✓ Under Video Mode

Click the "Browse" icon

➤ To directly enter into the image and video browse interface of internal storage (or external storage) according to the current storage state, shown in below Fig 7:





Fig 7: Image Echo Interface


- Double click the left button of mouse any one image thumbnail
- To display the image in full screen
- Double click the left button of mouse any video file
- To open the video in full screen, click the Play button to play the video, click it again to pause the video, click the replay button to Replay the video.

ⓘ NOTE: The function of Snap and Record cannot be used after enter into the browse interface.

ⓘ The images displayed in the list refers to the storage position setup in "System Setup", if it is set as internal storage, then it displays image and video in the camera, if it is set as external storage, then it displays the image and video in the external storage;

ⓘ 16 images and videos will be displayed in every page, click the icon  to check the previous or next image or video;

ⓘ Press icon  delete the selected image or video.

ⓘ Press icon  to return to video preview state.


ⓘ Press icon  to select the image again, and put the desired images in one window for browsing.

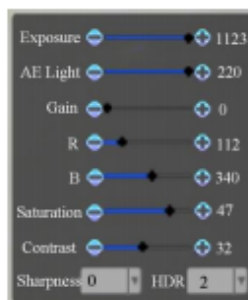
Image Effects



✓ Under Video Mode

Click the "Effects" icon

- Display the Image Effects Setting Interface, shown in below Fig 8:



- **Exposure Value**

Exposure value affects the exposure level of current image, this adjustment is available when video is on, the range is 0-1123, default value is 450.

ⓘ When automatic exposure is enabled, the exposure value can't be adjusted, the default is automatic exposure enabled.

- **Best Brightness (AE Light)**

Best brightness affects the real-time exposure effect, this adjustment is available when video is on, the range is 40-220, default value is 60.

- **Gain**

This gain is overall gain, increase the gain to greatly improve the brightness of the image, but it also increase the noise points of the video image, this adjustment is available when video is on, the range is 0-160, default value is 0.

- **Red Gain (R)**

The increase or decrease of this parameter will affect the red color in the current image, this adjustment is available when video is on, the range is 1-511, default value 302.

ⓘ After white balance, red plus will be automatically set by white balance.

- **Blue Gain (B)**

The increase or decrease of this parameter will affect the blue color in the current image, this adjustment is available when video is on, the range is 1-511, default value is 200.

ⓘ After white balance, blue plus will be automatically set by white balance.

- **Saturation**

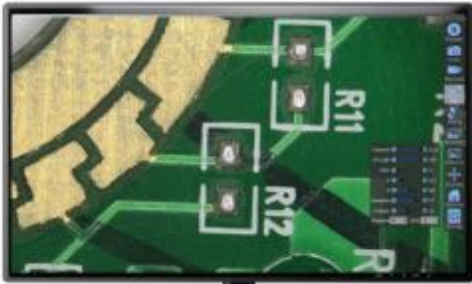
Saturation refers to the color chroma of the image, when the saturation of the whole image is dropped to 0, the image will change into gray, increase the saturation, it will increase the color purity of the image. This adjustment is available when video is on, the range is 1-63, default value is 47.

- **Contrast**

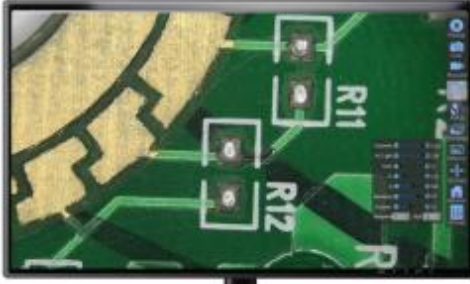
Contrast refers to the differences between different colors. The higher the contrast is, the higher the differences between colors, this adjustment is available when video is on, the range is 1-63, default value is 32.

- **Sharpness**

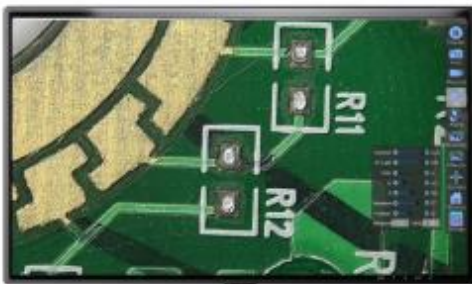
Sharpness refers to the resolution of the details and boundary of the image, this adjustment is available when video is on, the range is 0-2, default value is 0.



Sharpness 0



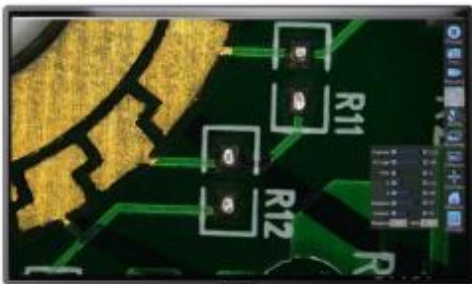
Sharpness 1



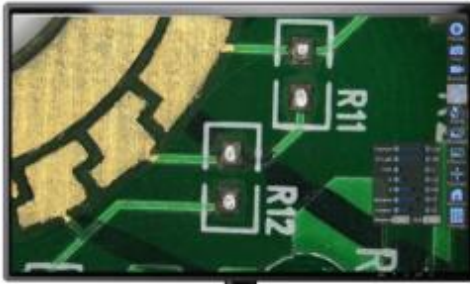
Sharpness 2

- **HDR**

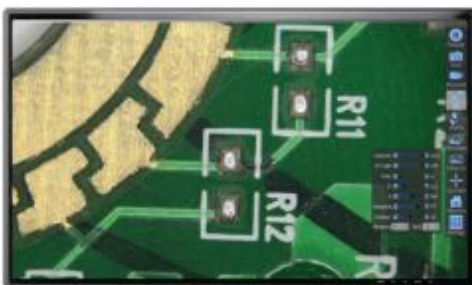
HDR refers to high dynamic range imaging, speaking simply, it means to make clear details of high luster or shadow in your image, and ensure that the effect of the image is nearly the same as the effect when observing with eyes, this adjustment is available when video is on, the range is 0-3, default value is 2.



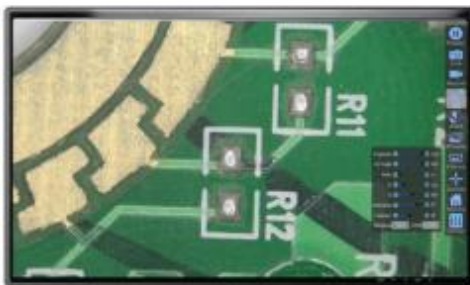
HDR 0



HDR 1



HDR 2



HDR 3

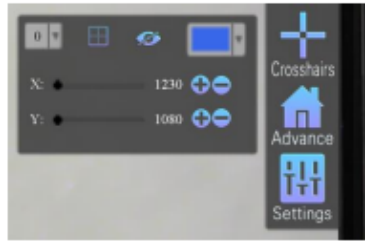
Crosshairs




✓ Under Video Mode

Click the "Crosshairs" icon

➤ Display the crosshairs menu, Shown in below:






● "1", "2", "3" and "4" mean the first, second, third and fourth group of crosshairs respectively.

● Click the button  to adjust the reticle center

●  Means crosshairs is under display state.

●  Means crosshairs is under hidden state.

● Click  to adjust the crosshairs color.

● Click the  and  at the right side of the crosshairs parameter to adjust the position.

⚠ **When crosshairs is under hidden state, the adjustment function is unavailable..**

Advance Function



✓ Under Video Mode

Click the "Advance" icon to open the advance function menu and pop up below Drawing interface:





Horizontal Flip

Turn the current image left and right at the horizontal direction. The original image and image after horizontal flip are shown in below respectively:



The original image



After horizontal flip



Vertical Flip

Turn the current image top and down at the vertical direction, The original image and image after vertical flip are shown in below respectively:



The original image



After vertical flip



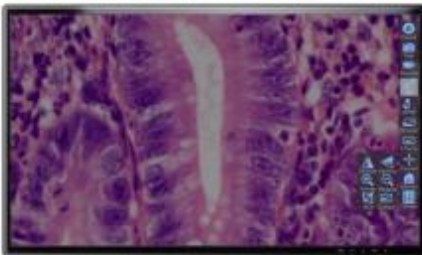
Enlarge

Enlarge the current image, click the icon to enlarge the current image level by level, or slide the mouse wheel forward on the screen to enlarge the current image.

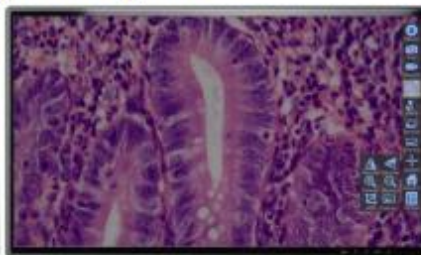


Reduce

Reduce the amplified current image, click the icon to reduce the current image level by level, or slide the mouse wheel backward on the screen to reduce the amplified current image level by level.



Enlarge



Reduce

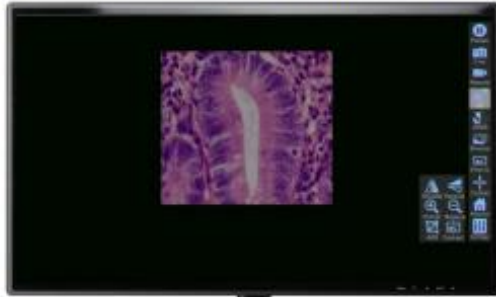


Available only under Video Mode.



AOI

Select the interested area. Click this icon, hold the left button of mouse on the screen and drag it to appear one area to display part of the current image, the image out of this area will be covered with blank screen, click the right button or click AOI icon again to exit AOI state.

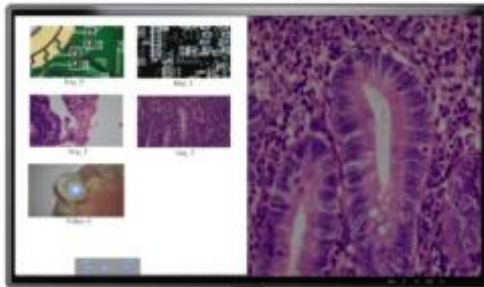


AOI state



Image Contrast

◆ Contrast the current image under video mode with the image saved in the memorizer. Click this icon, the screen is divided into two parts, the left part displays the image thumbnail interface of the current memorizer, the right part displays the image of the current video, as show in below:



The screen is divided into two parts

◆ Double click the thumbnail to open the desired image in the left, as show in below:



Image Contrast

◆ Drag the mouse on the image or video to move the current image or video.

◆ Click  to exit image comparison state.

System Setting



- ✓ Under Video Mode

Click the "Setting" button

- Open the setting menu and pop up below Drawing interface:



In Camera/In U Disk

The default storage of the system is In Camera, only after connecting with external storage, click the "In U Disk", the system may transfer to external storage state, after transferring, the status bar will appear corresponding prompt icon, please refer to Page 41.

Auto Name/Manu Name

Auto Name / Manu Name are the modes of naming the image and video when taking image and recording video. When it is set as "Auto Name", the file when taking image / recording video will be named according to the set naming mode, when it is set as "Manu Name", the screen will display the window of naming the image/video when taking image/recording video, and then input the name of the image / video.

中文/English

The default setting is "English", click this button to transfer and record current language, when reboot the system, this language setup is not changed.


Ruler Show/ Ruler Hide

The default setting is "Ruler Show", click this button to switch between ruler show and hide state, under the ruler hide state, the screen will display the complete image. The interface under "Ruler Display" state is shown in below



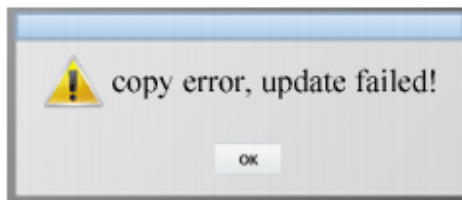
System Update

Update Method:

- ◆ Copy the update package with the postfix of “.tar.gz” to the root directory of external memorizer
- ◆ Insert the external memorizer in the USB interface of the camera
- ◆ Click the “Update” to display the update schedule bar , after updating, the camera will automatically reboot, after rebooting, check the Version Information to browse the version after updating.

ⓘ Please Update 2 times.

ⓘ If the camera is not connected with external storage, or external storage doesn't have the update package, update failure will pop up after clicking the “Update”, shown in below.



Update Failure

ⓘ After System Update, the automatic naming of “Image” and “Video” will be named as img_0,..img_N.jpg, and Video_0.mp4,.., Video_N.mp4 by turns.

Restore Default

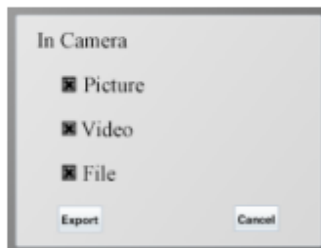
Clicking the “Restore Default”

- all values in “Image Effect” and “Crosshairs” will be recovered to the default state;

ⓘ If the image effect is adjusted improperly which causes distorted image display, please use the “Restore Default” function to recover to default settings, then perform white balance once to recover the image display to normal state.

Export

Click the “Export” button to pop up “Export” prompt window as below :



Export Contents Prompt

◆ Transmit the “Picture”, “Video”, “File” of recording measuring information from the internal storage to the external memorizer, and the exported contents will be retained in the internal memorizer.

◆ The default state is to export all images, videos and files.

ⓘ The dialogue box will pop up and execute the above functions and save as internal storage after inserting the U-disk and clicking the Export button.

ⓘ NOTE: The function of Snap and Record cannot be used after enter into the export interface.

Formatting

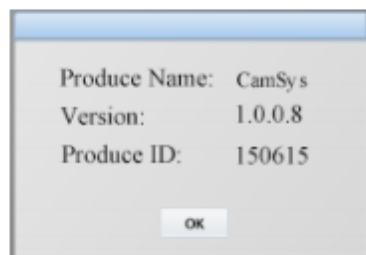
Click the “Formatting” button to format the internal memorizer, and all images, videos and files will be clear.

ⓘ Formatting does not affect external memory.

ⓘ NOTE: The function of Snap and Record cannot be used after enter into the Formatting interface.

Version Information


Click the “Version” button to pop up Version Information window as below:



Display the “Product Name”, “Software Version” and “Hardware Version” of the camera. The above mentioned information will change as system update.

Video Selection Function



- Select  or  in "Video Setting" to set the video resolution (720P and 1080P).
- ⓘ The selected item has ground color darkening and red frame such as , default settings are 1080P.

Functions of Measuring Area



Measuring Area Menu

Operation Instructions:


- During the process of drafting the measuring graphic element, after executing once measuring or drawing, the mouse doesn't exit the current measuring or drawing state, click the right button of the mouse or icon of current working state to exit current state.
- During the process of drafting the measuring graphic element, click the right button of the mouse to cancel current graphic element drafting. Under non drafting state, click the right button of the mouse to select the graphic element (except the key point), mouse changes into the small hand, move the mouse, then the graphic element will move accordingly, the selected graphic element color changes, after stopping movement, the graphic element will recover

to the original color. Click the right button of the mouse to select the key point of the graphic element, mouse changes into the small hand shape to modify the current key point by dragging, when modifying, the graphic element color changes, after modifying, the graphic element recovers to the original color.


- Double click the right button of mouse on the graphic element to prompt delete the Graphic Element or Not, operator may delete or cancel according to the actual demand.
- In the measuring tools, if icon button is displayed in sunken state, it means that the mouse is under current icon working state. Please refer to the above mentioned Operation Instructions 1 for exiting the working state.

Measuring Tools


Dot Pitch Measurement

- ◆ Click the  button to change it into sunken state, click the first measuring point in the screen to use the position of this point as one circle marking, then drag the mouse to form a straight line from the first measuring point to the current position of mouse, after clicking the second measuring point, it forms the measuring straight line. Click the left button of mouse at suitable position to put the measuring line, it displays the detailed spacing number at the parallel direction of the measuring line.
- ◆ After measuring, graphic element information box will display the name and marking number, key point (2 measuring points, measuring line placement point) coordinate and measuring value (length) and unit of the current graphic element.

Point-to-Line Spacing Measurement

- ◆ Click the  button to change it into sunken state, click any position on the straight line to be measured in the screen, it will mark the position of this point with one circle. Then click any other point on the line to be measured, click the point to be measured out of the straight line, it will form the measuring straight line, click the left button of mouse at suitable position on the measuring line, it displays the detailed spacing number at the parallel direction of the measuring line.
- ◆ After measuring the point to line spacing, graphic element information box will display the name and marking number, key point (2 measuring points on the straight line, independent measured point, measuring line placement point) coordinate and measuring value (length) and unit of the current graphic element.

Line-to-Line Spacing Measurement


- ◆ Click the  button to change it into sunken state, click any two

points on one straight line to be measured in the screen, then click any two points on the second straight line to be measured, it will form the measuring straight line. Click the left button of mouse at suitable position to put the measuring line, it displays the detailed spacing number at the parallel direction of the measuring line.

- ◆ After measuring the line to line spacing, graphic element information box will display the name and marking number, key point (four measuring end points, measuring line placement points of two straight lines) coordinate and measuring value (length) and unit of the current graphic element.


Center-to-Center Spacing Measurement



- ◆ Click the  button to sunken state, click three points on the screen to form the first measuring circle, then click three points to form the second measuring circle, it will form the measuring line between two circles, put the measuring line at the suitable position, it displays the detailed spacing number at the parallel direction of the measuring line.
- ◆ After measuring the center-to-center spacing, graphic element information box will display the name and marking number, key point (6 end points of two circles, measuring line placement point) coordinate and measuring value (length) and unit of the current graphic element.


Point-to-Center spacing Measurement



- ◆ Click the  button to change it into sunken state, click three points on the screen to form one measuring circle, then click the point to be measured, the point and circle form the measuring line, put the measuring line at the suitable position, it displays the detailed spacing number at the parallel direction of the measuring line.
- ◆ After measuring the point-to-center spacing, graphic element information box displays the name and marking number, key point (3 end points of circle, independent measured point, measuring line placement point) coordinate and measuring value (length) and unit of the current graphic element.

Line-to Center Spacing Measurement



- ◆ Click the  button to change it into sunken state, click three points on the screen to form the first measuring circle, then click any two points on the line to be measured, straight line and circle will form the measuring line, put the measuring line at the suitable position, it displays the detailed spacing number at the parallel direction of the measuring line.
- ◆ After measuring the line to center spacing, graphic element information box will display the name and marking number, key point (3 end points of circle, 2 points of the straight line, measuring line

Polygon



- ◆ Click the **Polygon** button to change it into sunken state, click on the screen to form polygon, click it again at the last point of the polygon to form the closed graphics, and form marking at the end point at the right side of the polygon.
- ◆ After drafting the polygon, graphic element information box will display the name and marking number, the selected key point (all points for forming polygon) coordinate and measuring information and unit of the current graphic element, including circumference and area of polygon.

Poly line



- ◆ Click the **Crease** button to change it into sunken state, click on the screen to form fold line, click it again at the last end point of the poly line to finish drawing the poly line, form marking at the end point at the right side of the poly line.

After measuring the polygon, graphic element information box will display the name and marking number, the selected key point (all points of the poly line) coordinate and measuring information (line length) and unit of the current graphic element.

Annotation



Click the **Text** button to change it into sunken state, click any position in the screen to pop up annotation window, click the "Keyboard" button in the window, then click the corresponding number or letter (← means clear, "Enter" means new line) according to the actual demands, click the "Enter" to display the input number or letter in the screen.

Delete Graphic Element



Click the **Del All** button to prompt delete all graphic elements in the screen or not, no matter if there's selected state, click Enter to delete all, delete or cancel this operation according to the actual condition.

Color Setup



Click the **Color Setup** button, select the desired color in the displayed colors, when measuring or drafting graphics, the selected color will be the main displayed color of the graphic element.

Save Graphic Element



Click the **To Pictures** icon to save the current image into a new image with measuring graphic element information, there're N images in the memorizer, the name of the N image is Img_N, then the name of the current saved graphic element image is Img_N+1.

Export Data



Click the **To Excel** icon to save the current measured or drafted graphic element information in the current memorizer as EXCEL file, the included files are: EXCEL file and 3 images.


Bench Mark Tool



Click  to open the “Bench Mark Tool” window shown in below :




Create and Delete Bench Mark

- ◆ Click the “Create Bench Mark” icon  ;
 - Enter create bench mark state.
- ◆ Click one point on the screen with the mouse, then drag the mouse and click the other point to select the bench mark length ;
 - it will pop up the window shown in below, input the name, unit and precision, and length of the bench mark, click Enter to finish bench mark setup, click Cancel to return to the selection state.

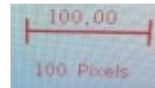


New Bench Mark Information Window

- ⓘ After setting new bench mark, the information of all graphic elements in the screen will change accordingly.
- ◆ Click the “Delete Bench Mark” icon  to delete the current bench mark (except the system default bench mark), all measuring datum will recover to the default bench mark state.

Scale Display /Hidden

Scale is the graphic element for marking the effect of current bench mark, this graphic element displays the length information of 100 pixels of current bench mark, according to different bench marks, the marked number will change. The corresponding scale of default bench mark is shown in below:




New bench mark information window

Click this button to display or hidden the current scale graphic element, default is hidden scale, shown in below.



Scale displays the hidden

Scale Position

Click the "Scale Position" button  to display 4 positions: Left Up, Right Up, Left Down, Right Down, after selecting any position, the scale be put in corresponding position.

Graphic Element Information

Click the "Graphic Element Information" icon or any icon in the "Measuring Tools" menu to open the "Graphic Element Information" window, shown in below




ⓘ After measuring or drafting the graphic element each time, the graphic element information box will automatically display related information of the current graphic element, including: name, key point, information (length or angle) and unit.

ⓘ If the graphic element information is under display state, click the "Graphic Element Information" button to turn off the graphic element information, and it won't automatically display related information of the current graphic element in the next drafting or measuring.

Return



Click the "Return" icon  to exit the current measuring mode state and return to the video mode state interface (if entering into measuring mode state under image mode state, click the Return icon to return to the image mode state interface).

Status Bar Function Area

Status Bar Overview

The status bar displays the following contents: camera working mode, pixels coordinate of the screen, WIFI connection state, internal and external memorizer state, system time, shown in below



When the camera is working, the status bar will display the current working mode, altogether three modes:

- Video Mode: click any icon in the video area menu, status bar displays the current state with "Video".
- Picture Mode: click the "Image Echo" to open any image, status bar displays the current state with "Picture".
- Measuring Mode: click any icon in the measuring tools of the measuring menu or bench mark tools, the graphic element information status bar displays the current state with "Measuring Mode".

ⓘ When transferring the mode, the status bar displays the current mode.

ⓘ Status bar menu will be displayed immediately when you move the mouse to Status bar in which it is designed to be a hidden menu.

Mouse Position Display


The data at the right side of the "xx mode", shown in drawing




Video <1139, 561> <1139, 561>, it means the position coordinate of the pixel point in the screen.

WIFI Operation of Camera

WIFI connection state display

ⓘ When it is not connected with WIFI hardware in the USB interface,


WIFI in the displays the icon , after connecting with the WIFI hardware in the USB interface, WIFI in status bar displays one of the following 3 states:

-  Means WIFI is working under AP mode.
-  Means WIFI is working under STA mode, connection wireless network hotspot failure.
-  Means WIFI is working under STA mode, connection wireless network hotspot success.

WIFI OFF and ON

- WIFI doesn't support to hot plug. When you need to plug WIFI in the boot, you need to turn off the WIFI and remove the WIFI hardware. Reconnect to the WIFI hardware and then turn on the WIFI
- Disable WIFI: double click the WIFI icon in the status bar to pop up the dialog box to disable WIFI function, click Enter to disable WIFI function.




- Enable WIFI: if WIFI is disabled, double click the WIFI icon  in the status bar to pop up the dialog box to enable WIFI function dialog box, click Enter to enable WIFI function.



WIFI working mode

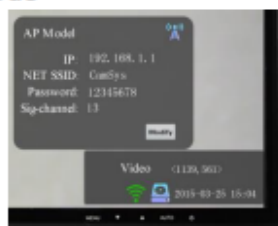
WIFI has two working modes:

- STA Mode: which means: it is not used as a wireless network card, and doesn't generate network signal itself, it requires connecting with the external wireless network hotspot for accessing Internet.
- AP Mode: which means: it is the wireless network hotspot itself, sends wireless signal, and allows the user to search and connect the hotspot with client terminal.




WIFI Use method

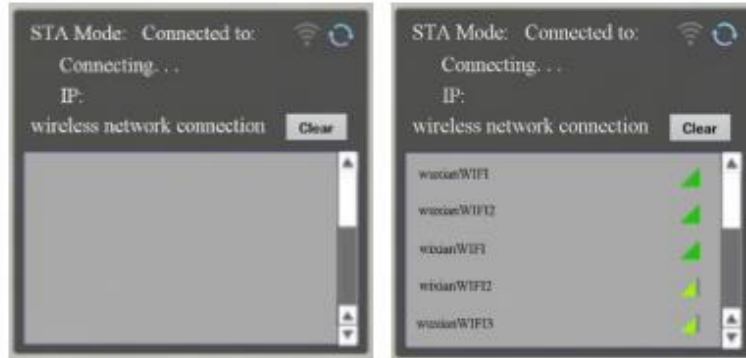
 If the WIFI hardware has been connected after booting the instrument, the WIFI function will be automatically enabled (the working mode is the previous mode when using WIFI at the last time). If the WIFI hardware is not connected after booting the instrument, then the state bar doesn't display the network card icon, contrarily, it display the icon of corresponding working mode (for STA mode, icon displays the signal intensity of the connected hotspot).

- When AP mode is enabled, click the WIFI icon  of AP mode in the status bar to pop up WIFI settings of AP mode, the corresponding interface is shown in below, click the "Modify" button to modify the name and password and communication channel of the hotspot, click the  icon in the interface to switch to STA mode






AP mode interface





- When STA mode is enabled, click the WIFI icon  (or ) of STA Mode in the status bar to pop up WIFI settings interface of STA mode. Below left Drawing means that it doesn't connect any hotspot, click the refresh icon  in the settings interface to list out the searched hotspots, shown in below right Drawing:



STA Mode doesn't connect any hotspot and list out the searched hotspots

- ⓘ Click the WIFI hotspot in the hotspot list, input corresponding password to connect, after successfully connecting, the interface displays the IP address of the camera distributed by this hotspot.
- ⓘ Click the "refresh" icon  to real-time refresh WIFI hotspot list.
- ⓘ Click the "AP mode" icon  to switch to AP working mode
- ⓘ Click the "Disconnection" icon  to cut off the connected hotspot.
- ⓘ When WIFI settings interface is opened, click the "WIFI Icon" in the status bar to hidden the WIFI settings interface.

Internal/External Memory

-  Without any memorizer.
-  Only with internal memorizer.
-  External memorizer is identified normally, with internal memorizer, the default storage is internal storage.
-  With internal memorizer and external memorizer, current storage state is external storage.
- ⓘ Only when there's memorizer, the camera can take photograph, record video and operate other functions. Click the "Internal Storage" or "External Storage" in "System Setup" to transfer the current memorizer

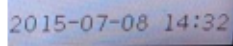
state.

- ⓘ When storage capacity less than 20% , the bottom left corner of the camera interface will prompt “ Capacity is less than 20%”



- ⓘ When the remaining storage space is less than 5%, clicking on the video will prompt “No enough space left” and don't perform the video recording. If the video process recognizes that the storage space less than 5%, the ongoing video will automatically stop.

System Time Setup



- ◆ Click the icon of displaying time in the status bar of the interface, shown in , select corresponding year, month, date, hour, minute and second, slide the mouse wheel to modify the parameter, click “OK” after modifying. Select “Year” with the mouse, for example: “2016”, slide the mouse wheel to set the desired year, slide the mouse wheel to select “2016”, the settings for month, date, hour and minute are the same.


- ⓘ The set time will be saved for 100 hours under power off state, if the instrument is not powered on for a long period, the set time may possibly get lost.

Peripherals and Application

External Storage Device (U-disk)

Connecting the U-disk

- After connecting the U-disk, the interface will pop up the icon  to show that the U-disk is connected.  Means that U-disk is connected, but the default memorizer is internal storage; Click the “In U Disk” in “System Setup” to transfer the memorizer to external storage

- The storage state in the status bar is shown as . Click the memorizer icon to pop up the window to unload external storage or not, select to unload external memorizer or not according to the demands.

- ⓘ Remove the U-disk, after confirming to remove the U-disk before take out it, otherwise, it may possibly cause data loss. The format of the storage device should be FAT32, otherwise, it can't be identified.




WIFI HARDWARE OF USB INTERFACE

When it is not connected with the WIFI hardware at the USB interface,

- The WIFI icon in the status bar is displayed as 

After connecting with the WIFI hardware at the USB interface,

➤ The WIFI icon in the status bar will display one of the following three states:

-  Means WIFI is working under AP mode.
-  Means WIFI is working under STA mode, connect wireless network hotspot failure.
-  Means WIFI is working under STA mode, connect wireless network hotspot success.





[Please refer to the page 33 to 35 for detailed information.](#)

Mouse and Keypad


Connection

The mouse (or U-disk, WIFI hardware) supports hot plug.

Application of Mouse

- During measuring graphic element or drafting graphic element, click the right button of the mouse to cancel drafting the current graphic element. Under non drafting state, click the right button of the mouse to select graphic element (except the key point), the mouse changes into a small hand shape, then hold the right button and move the mouse, the graphic element will move accordingly, the color of the selected graphic element changes, after stopping the movement, the graphic element recovers to the original color. Double click the right button of mouse to select the key point in the graphic element, mouse changes into a small hand shape, drag the mouse to modify the current key point, the color of graphic element changes when modifying, after stopping modification, the graphic element recovers to the original color.
- Click the  icon in advanced function, after selecting the interested area, click the right button of the mouse at any point of the interface to exit AOI state.
- Click the  icon in advanced function, after the mouse has changed into the small hand in the video area and open the image, the mouse also changes into the small hand in the image area, hold the left or right button of the mouse to move the mouse, the image moves with the mouse accordingly.
- Click the  icon in the advanced function, the mouse changes into the small hand in the video area outside of the video menu, slide the mouse wheel forward to zoom in the current image; under the image zoom in state, click the  icon, slide the mouse wheel backward on the screen to zoom out the current amplified image level by level.

Application of Soft Keyboard

For convenient input by client, this software provides the soft keyboard button . Click this button to open one window (is shown in below) to simulate the keyboard input. Click it again to disable the soft keyboard.



Soft Keyboard

ⓘ “←” means clear, “Enter” means new line.

This assistant tool can be used for the following four places:

- In the image automatic naming interface, input name.
- In the video automatic naming interface, input name.
- In the data exporting interface, input export file name.
- In the scale creating interface, input name and length.
- Modify the WIFI name, password and communication channel.

ⓘ Note: wireless keyboard can be operated also.

Camera WIFI-Android Client Terminal Software Overview

Software Installation

Copy the APP software to the Android mobile phone, then install it, after



installing, the CamSys icon is

Connection




- When the camera is under AP mode, the mobile phone WIFI can connect the WIFI network hotspot of the camera, for example: CamSys.
- ⓘ The default network password is: 12345678, default IP address is: 192.168.1.1.
- When the camera is under STA mode, which means the camera connects with the external WIFI network hotspot and get one distributed IP address. The mobile phone WIFI should also connect with this external WIFI network hotspot, then open the CamSys software and input camera IP address to connect the camera.

Introduction to Functions of Software

After open the software, interface is shown in below

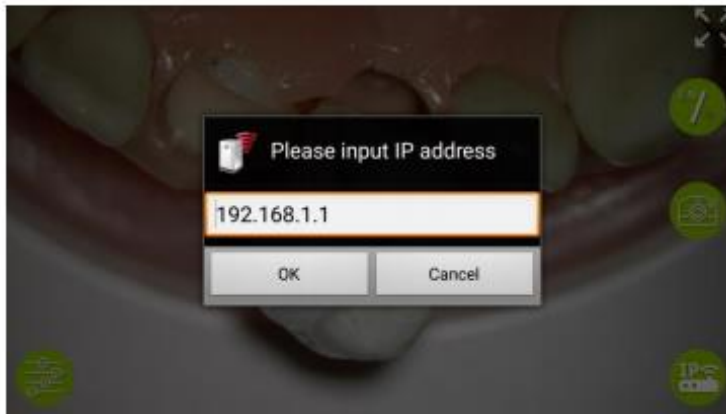


Software Interface

Introduction to Function Buttons:		: Display in full screen, click it to display in full screen, all buttons on the screen will be hidden.
		: 中文/English Click this button to transfer and record current language
		: Photographing button, click it once to photography one image and save in the mobile phone, but the image won't be saved in the camera.



: Set IP address, click it to input camera IP address, shown in below, click it to connect the camera.



IP Address




: Setting button, click it to pop up the set items, shown in below




Setup Interface

ⓘ When adjusting the settings of the parameters with the mobile phone, the image effect will changes simultaneously in the LCD display.

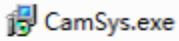
ⓘ The "Resolution Switch" in the mobile phone software is only valid to the image which is displayed in the mobile phone and photographed by the mobile phone. The corresponding resolution of 720P image is 1280x720(1.2M), 1080P image is 1920x1080(2M).

ⓘ : AE, Can be used to turn on or off the automatic exposure on the camera.

ⓘ : AWB, Click the button the camera enters into the automatic white balance state.

Camera WIFI - Windows Client Terminal Software Overview

Software Installation



The software for WINDOW client terminal can be installed in the computer /notebook with WINDOW XP, WIN7, WIN8, WIN10 system. The installation is introduced with the example of WIN10 system.

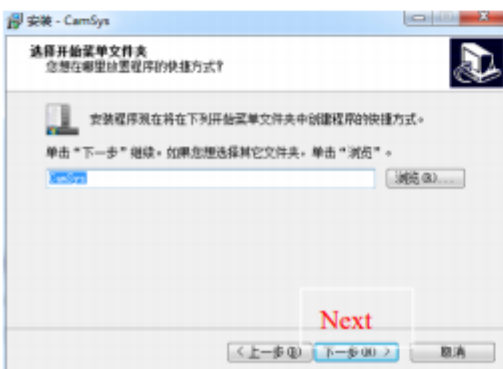
- ◆ Double click the CamSys.exe installation file.
- ◆ Select in the pop up User Account control dialog box: "Yes", it will appear the installation dialog box, click the "Next"

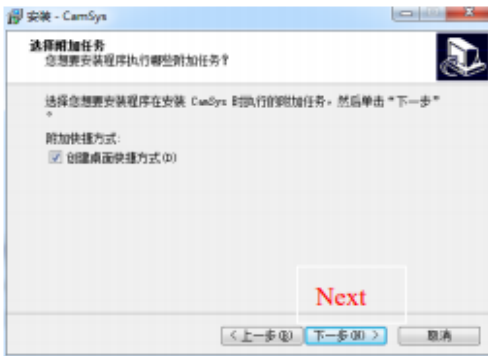


- ◆ Select installation route, then click the "Next"

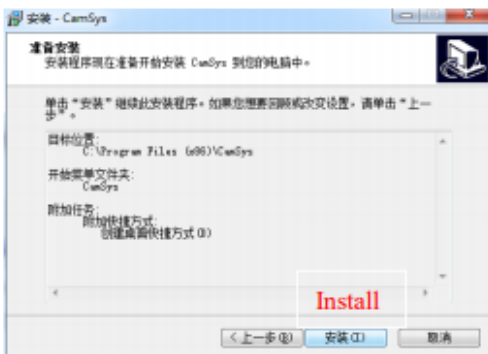


- ◆ Select the start menu folder as default, then click the "Next"

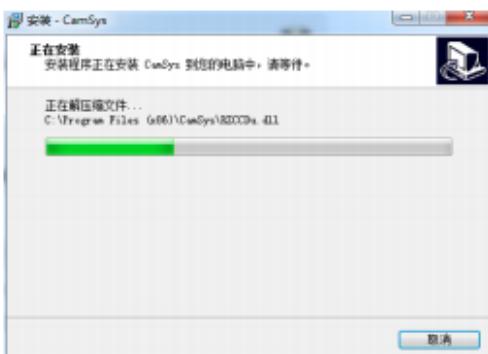




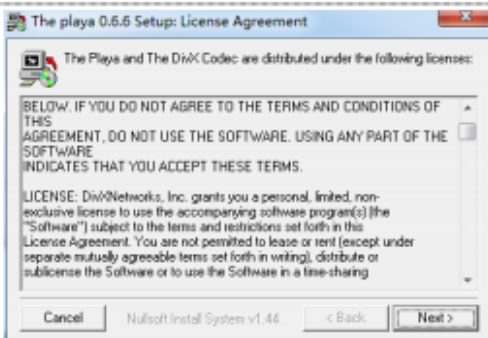
- ◆ Create desktop shortcut or not, set default, then click the “Next”



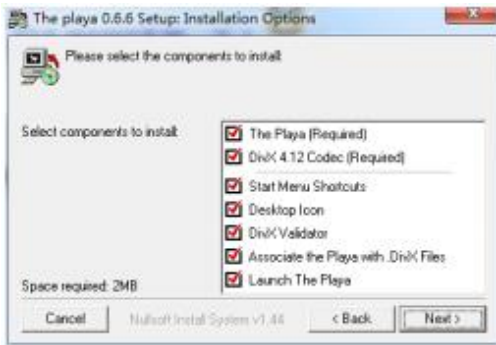
- ◆ Start installation, click the “Install”



- ◆ The installation process



- ◆ The installation process prompted to install Codec(compressor), click the "Next"



- ◆ The default installation options, click the "Next";



- ◆ Select installation route, default, then click the "Next"



- ◆ The default, click the "Yes"



- ◆ After installation, click the "Finish".

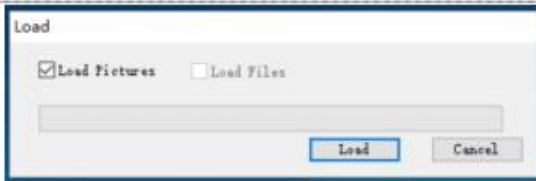
Connection

- When the camera is under AP mode, computer /notebook WIFI can connect the WIFI network hotspot of the camera, for example: CamSys, the default network password is: 12345678, default IP address is: 192.168.1.1.
- When the camera is under STA mode, the camera connects with the external WIFI network hotspot and gets one distributed IP address. The computer /notebook WIFI should also connect with this external WIFI network hotspot, then open the CamSys software and input camera IP address to connect with the camera.

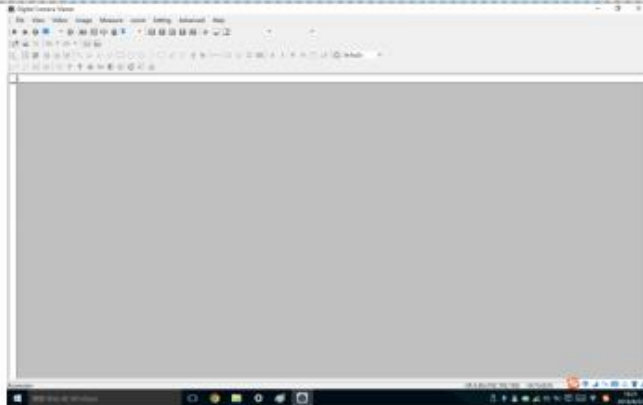
Open Software



- ◆ Double click the CamSys icon, to open the software.



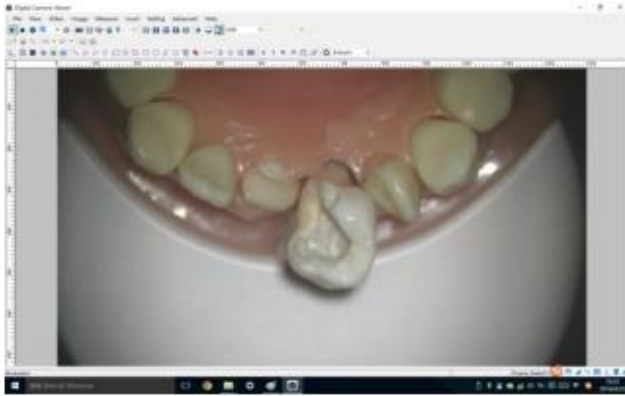
- ◆ Then pop up one loading dialog box to load the existed images and videos, if the user don't want to load them, please click the "Cancel"




- ◆ Enter in the software, the interface is shown in left.



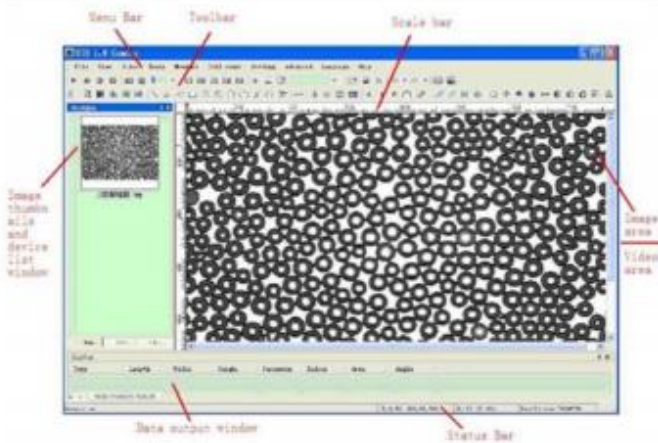
- ◆ Set camera IP, select "Set/Modify IP", then input camera IP in the new dialog box



- ◆ Start video, click the  icon in the video toolbar to start video, the image area will display the image of the camera

Introduction to Functions of Software

The introduction to software menu and every function are listed in the Help, therefore, it is not introduced repeatedly in the User's Manual.



User Interface

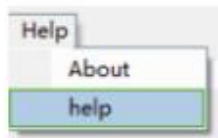
Software main form mainly consists of seven parts:

- Menu Bar
- Toolbar
- Scale bar
- Image area(video area)
- Image thumbnails, device list window and file list window
- Data Output Window
- Status Bar



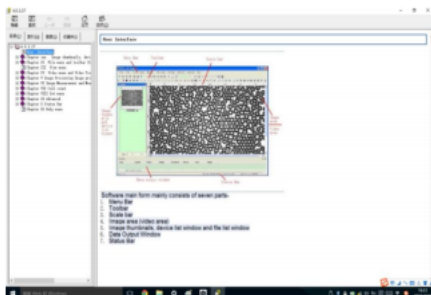
Transfer the Language

Transfer the language between Chinese and English in menu /settings /language, the set language will be enabled after starting the software for the next time



Using Help

Click the menu: Help /Help to open the Using Help of the software



Help File Interface

Troubleshooting and After Sale Service

Troubleshooting

Faults	Possible Reason	Solutions
Power indicator doesn't light on	External power supply is not connected correctly	Check if the external power supply is connected
	Power adapter doesn't work	Check if the power adapter is under normal conditions
Without image output	External power supply is not connected correctly	Check if the external power supply is connected
	External display is not connected correctly	Check if the external display is under normal conditions
	HDMI cable fault	Check if the HDMI cable is under normal conditions
	Camera module is unavailable	Check if the camera modular is under normal conditions
Color distortion	The color is adjusted improperly	Factory Reset, white balance again
	White balance is not operated correctly	
System halted	System crash	Reboot system or update system
	The instrument is overheat	Check the heat emission system of the instrument
Image is not clear	Camera lens is dirt	Wipe the camera lens
	Incorrect focus	Adjust the focus
WIFI client terminal doesn't display image	Connect USB WIFI hardware or not	Check if the WIFI hardware is connected, check if the WIFI function is enabled
	Check if the IP address is accordant with the camera IP address	Check if the client terminal software IP address is accordant with the camera IP address Update the system

Ryf After Sales Service

Any unauthorized repair or modification to the Ryeco Camera will cancel the factory warranty. In order to safely ship the camera to Ryf Ltd Switzerland for repair, please so keep the original Package case.

One Year Ryeco warranty service, please keep the invoice. www.ryfag.ch