

Equipment Type:	Digital Stereo Microscope (includes monitor)
Model:	<b>VM-100</b>
Electrical Requirements:	110V
Frequency:	47-63Hz
Manual Revision Date:	February 2, 2018

Please read this instruction manual carefully and follow all installation, operating and safety guidelines.

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## **WARRANTY**

### **Terms and Conditions applying to all PACE Technologies Products**

#### **1. LIMITED WARRANTY AND DISCLAIMER:**

PACE Technologies microscopes and hardness testers are warranted for one year from the purchase date to be free from defects in material and workmanship under correct use, normal operating conditions, and proper application. PACE Technologies obligation under this warranty shall be limited to the repair or exchange, at PACE Technologies option, of any PACE Technologies Product or part which proves to be defective as provided herein. PACE Technologies reserves the right to either inspect the product at Buyer's location or require it to be returned to the factory for inspection. Buyer is responsible for freight to and from factory on all warranty claims. The above warranty does not extend to goods damaged or subjected to accident, abuse or misuse after release from PACE Technologies warehouse, nor goods altered or repaired by anyone other than specifically authorized PACE Technologies representatives. PACE Technologies shall not in any way be responsible for the consequences of any alteration, modification or misuse unless previously approved in writing by an officer of PACE Technologies. Note: Corrosion is considered a maintenance issue and not a warranty issue. PACE TECHNOLOGIES MAKES NO EXPRESS WARRANTIES OTHER THAN THOSE WHICH ARE SPECIFICALLY DESCRIBED HEREIN. Any description of the goods sold hereunder, including any reference to Buyer's specifications and any description in catalogs, circulars and other written material published by PACE Technologies, is the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. THIS WARRANTY STATES PACE TECHNOLOGIES ENTIRE AND EXCLUSIVE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR ANY CLAIM FOR DAMAGES IN CONNECTIONS WITH PACE TECHNOLOGIES PRODUCTS. PACE TECHNOLOGIES WILL IN NO EVENT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, NOR FOR ANY SUM IN EXCESS OF THE PURCHASE PRICE.

PACE TECHNOLOGIES MAKES NO EXPRESS WARRANTIES OTHER THAN THOSE WHICH ARE SPECIFICALLY DESCRIBED HEREIN. Any description of the goods sold hereunder, including any reference to Buyer's specifications and any description in catalogs, circulars and other written material published by PACE Technologies, is the sole purpose of identifying such goods and shall not create an express warranty that the goods shall conform to such description.

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#### **2. LIABILITY CAP:**

PACE Technologies maximum aggregate liability for loss and damage arising under, resulting from or in connection with the supply or use of the Equipment and Consumables provided under this purchase, or from the performance or breach of any obligation (s) imposed hereunder, whether such liability arises from any one or more claims or actions for breach of contract, tort, (including negligence), delayed completion, warranty,

indemnity, strict liability or otherwise, unless otherwise limited by the terms hereof, shall be limited to one hundred percent (100%) of the purchase price.

### **3. DELIVERY:**

Customer assumes and shall bear the risk of all loss or damage to the Products from every cause whatsoever, whether or not insured, and title to such Products shall pass to Customer upon PACE Technologies delivery of the Products to the common carrier of Pace Technologies choice, or the carrier specified in writing by Customer, for shipment to Customer. Any claims for breakage, loss, delay, or damage shall be made to the carrier by the Customer and Pace Technologies will render customer reasonable assistance in prosecuting such claims.

### **4. ACCEPTANCE:**

Customer shall inspect the Products promptly upon receipt of delivery. Unless customer objects in writing within thirty (30) business days thereafter, customer shall be deemed to have accepted the Products. All claims for damages, errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

### **5. PAYMENT:**

Customer agrees to provide timely payment for the Products in accordance with the terms of payment set forth on the reverse side hereof or in any proposal submitted herewith. If any payment is not paid on or before its due date, Customer shall pay interest on such late payment from the due date until paid at the lesser of 12% per annum or the maximum rate allowed by law.

### **6. DEFAULT:**

If Buyer is in default (including, but not limited to, the failure by Buyer to pay all amounts due and payable to Seller) under the work or purchase order or any other agreement between Buyer and Seller, Buyer's rights under the warranty shall be suspended during any period of such default and the original warranty period will not be extended beyond its original expiration date despite such suspension of warranty rights.

### **7. MISCELLANEOUS PROVISIONS:**

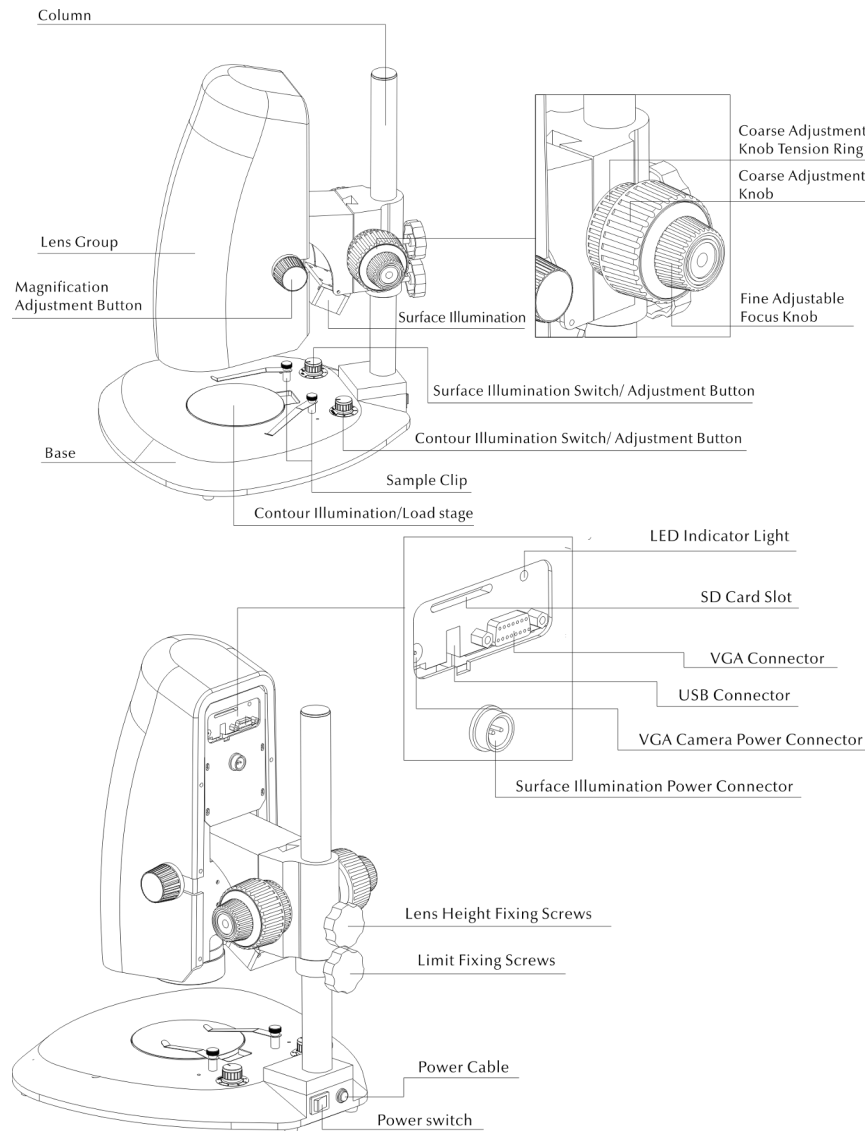
This agreement has been made in and shall be governed by the laws of the State of Arizona. These terms and conditions and the description of the Products on the reverse side hereof or in any proposal submitted herewith constitute the entire agreement and understanding of the parties with respect to this sale and supersede all prior and contemporaneous agreements or understandings, inducements or representations, expressed or implied, written or oral, between the parties with respect hereto. Any term or provision of this Agreement may be amended, and any observance of any term of this Agreement may be waived, only by a writing signed by the party to be bound. The waiver by a party of any breach shall not be deemed to constitute a waiver of any other breach. Should suit be brought on this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and other costs of suit including costs and attorneys' fees incurred on appeal or in collection of any judgment. The waiver by a party of any breach shall not be deemed to constitute a waiver of any other breach. Should suit be brought on this Agreement, the prevailing party shall be entitled to recover its reasonable attorneys' fees and other costs of suit including costs and attorneys' fees incurred on appeal or in collection of any judgment. errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

### **8. RESTOCKING FEE:**

All Returns are subject to a restocking charge equal to 15% (fifteen percent) of the Invoice, unless the Goods are proved to be non-conformed by PACE Technologies.

## 1.0 Product Description

### 1.1 General Description



The VM-100 is an advanced Digital Stereo Microscope with built-in image processing capabilities. High quality image processing software is built into the system to aid in capturing specimen details. The VM-100 communicates automatically with the included monitor.

## 1.2 Technical Specifications

Product Name	Digital Stereo Microscope System
Model	VM-100
Zoom Lens	0.7X ~ 4.5X Detented Zoom Lens <a href="#">Zoom Ration</a> 6.5: 1
Z-axis Travel	Vertical Space Approx. 6-inch (150mm); Adjustable Focus travel 2-inch (50mm); Working distance 3.5-inch (85mm)
Microscope Holder	Precision coarse and fine adjustment
Illumination	Adjustable LED Contour and Surface lighting
Video System	Built-in FULL HD camera , USB 2.0, VGA, SD card integrated camera
Storage Capacity	8G SD Memory Card (included)
Camera	1>>> Simple graphic operation
	2>>>Support USB and VGA sync-output, USB interface can connect to mouse and PC system
	3>>>Takes up to 30 pictures a second with adjustable camera settings
	4>>>Optional Manual adjustment mode
	5>>>Ability to display cross lines overlay
	6>>>200 million pixels
Power Supply	VAC 90~240V; 47~63 HZ
Dimensions	Approx. 11.5 x 11 x 16-inch (290 x 280 x 400 mm)
Packing Dimensions	Approx. 17.5 x 16 x 14-inch (445 x 410 x 355 mm)
Operation Environment	Temperature: 41° – 104°F (5° – 40°C )
	Maximum relative humidity: 88°F (31°C ) - 80 % 93°F (34°C ) - 70 % 99°F (37°C ) - 60 % 104°F (40°C ) - 50 %
	Voltage fluctuation: ± 10%
	Pollution level: 2 (according to IEC664)
	Classification of installation voltage: II (IEC664)

### 1.3 Features and Benefits

The VM-100 is a high definition Digital Stereo Microscope that is capable of capturing optimal images of targeted areas. The high definition camera communicates automatically with the included monitor for better viewing than traditional microscopes. The built-in image processing software has easy to use mouse controls that make the image capturing process easier and hassle free. Use the built-in screen image capture capability to create detailed pictures for reporting results.



**Note:** Installation of the VM-100 base should be on a flat sturdy surface, with easy access to electrical connectors as well as power switches and video cables.

## 2.0 Unpacking, Shipping and Installation

### 2.1 Unpacking

Unit is delivered in a box. Unpack and check for completeness of parts.

Measures WxHxD: 17.5 x 16 x 14-inch (445 x 407 x 356 mm)

Weight: 12 lbs (5.5 kg)

### 2.2 Shipping

When moving box, lift from bottom.



**! Caution:** Heavy sensitive electronic equipment. Take care to avoid bodily injury and damage to the unit.



## 2.3 Installation



Install unit carefully! Improper installation voids warranty.

The **VM-100 base** should be placed on a flat stable surface.  
Requires electrical connections

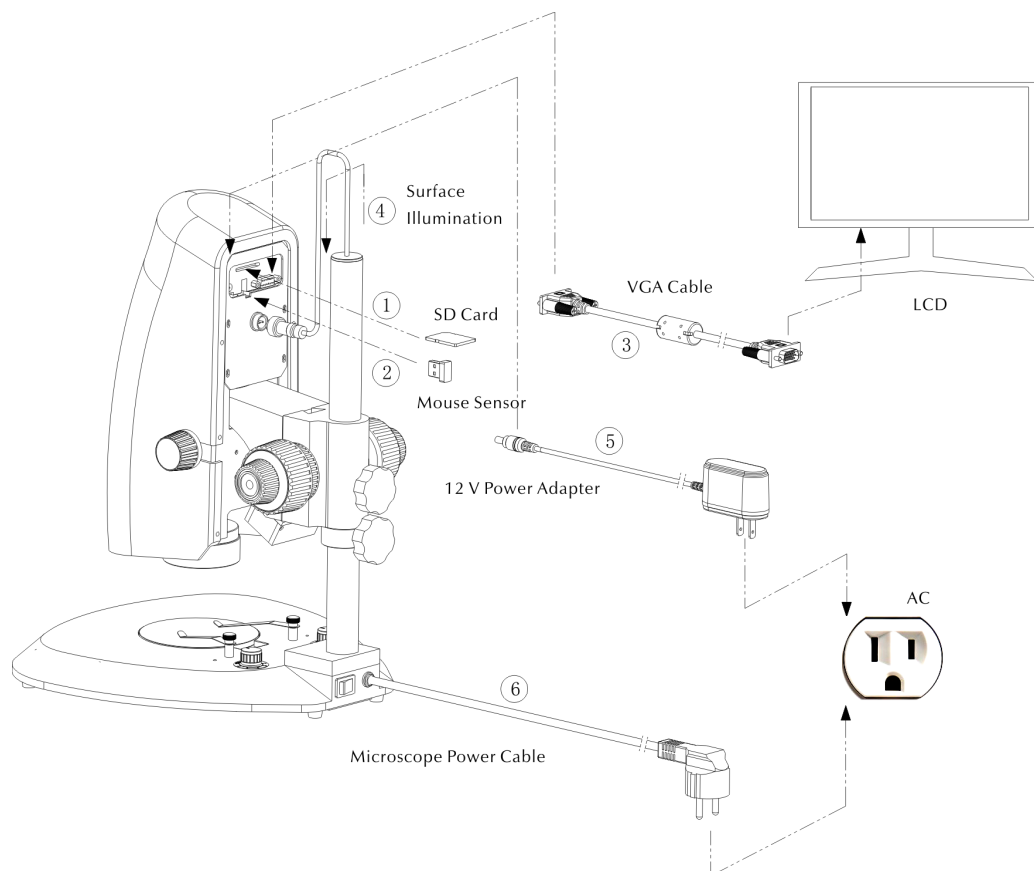
Position the VM-100 on a flat surface with enough room to place LCD monitor at a comfortable viewing angle.

Connect the Mouse Sensor to the back USB port and the VGA into the back of the LCD monitor

Connect the Surface Illumination cord to the back of the VM-100

Attach 12V Power Adapter as well as the Microscope Power Cable to the back of the VM-100 then into a power socket.

VM-100 is ready to turn on and use



### **3.0 Safety Guidelines**

#### **3.1 Warning Sign**

**!** This sign points to special safety features on the machine.

#### **3.2 Safety Precautions**

**!** IF the VM-100 overheats or produces an odd smell, power off immediately

**!** Keep cords away from light source to avoid melting or other damage to cords

**!** Use the appropriate power cord to ensure proper electrical connection

**!** The head of the VM-100 moves vertically when set screws are loosened. Ensure set screws are properly tightened before returning to use

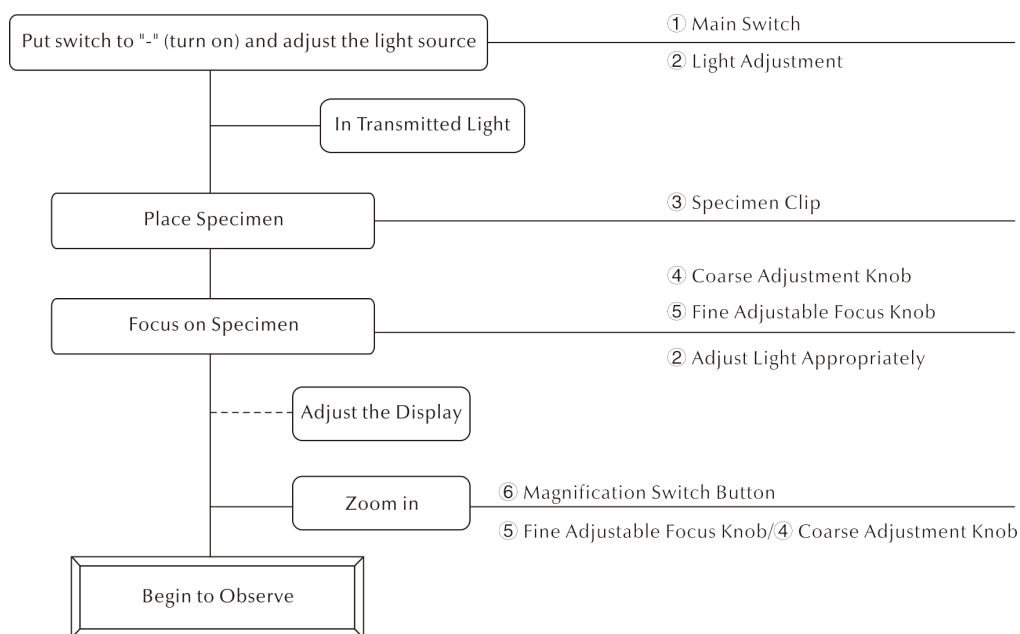
**!** Do not modify internal or external components as this will cause unknown operational hazards; this will also void all warranty claims.

#### **3.3 Emergency Statement**

The VM-100 is a Digital Stereo Microscope designed for capturing images of samples under light and magnification. Be mindful of surroundings and follow all operational guidelines. In the event of an injury report to appropriate medical service.

## 4.0 Steps for Observation

1. Turn on VM-100 using main power switch on back of unit
2. Adjust light source using Surface and Contour Illumination Switches
3. Place sample onto the stage (secure specimen using Sample Clips if needed)
4. Use Coarse Adjustment Knob to find general focus
5. Use Fine Adjustment Knob to find final focus (Adjust light again if needed)
6. Zoom in using the Magnification Switch
7. Fine Adjustment might be needed again to focus sample
8. Observe Sample



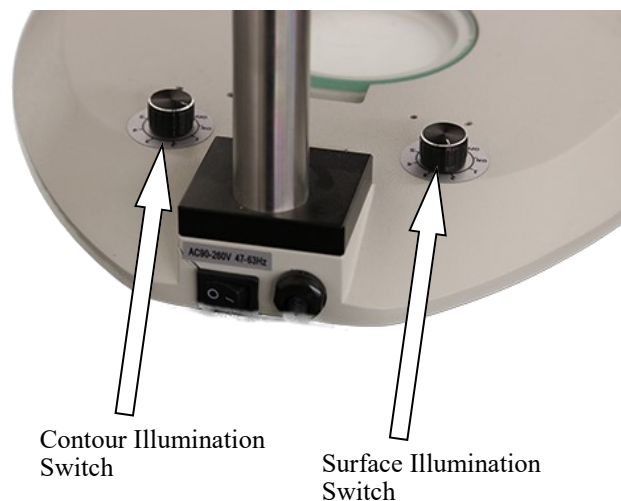
## 5.0 Adjustment Features

### 5.1 Illumination Adjustment

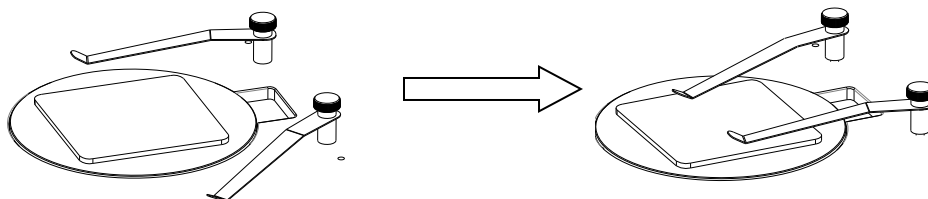
#### ① Surface Illumination Knob

#### ② Contour Illumination Knob

1. Turn the knob clockwise to activate the light, when it points to ON you will hear a click. The light gets brighter as you turn this direction.
2. To turn the light off, turn it counter – clockwise until you hear another click.
3. Use both Surface and Contour lighting to find correct illumination for sample.



### 5.2 Specimen Placement



The Sample Clips are for fixing the object being observed, and can effectively prevent vibrations in the environment from moving the image. Steps for securing specimen:

1. Loosen both spring screws
2. Place sample on stage and position in desired location
3. Position both Sample Clip arms onto sample
4. Tighten Sample Clip arms using spring screws

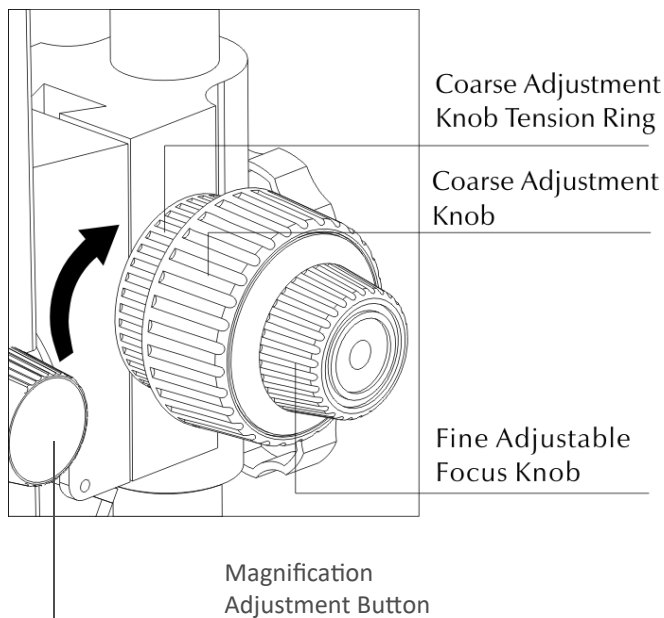
**TIP: Use gloves to avoid leaving finger prints on samples when adjusting position on stage.**

### 5.3 Adjusting Focus

**!** Do not use force movement, knobs should operate without applying excessive force.

NOTE: Ensure Coarse Adjustment Knob Tension Ring is tensioned (VM-100 ships already tensioned for ease of use)

1. After placing sample on Stage move the Coarse Adjustment Knob until the object is in focus on the LCD monitor.
2. If the object is too far or too close, adjust the Lens Height Adjustment Screw and repeat step 1
3. After coarse adjustment, use the Fine Adjustable Focus Knob until specimen is fully in focus on the LCD monitor.
4. Use the Magnification Adjustment Button to increase magnification on the sample. (Knob will click when fully engaged)
5. Use the Fine Adjustable Focus Knob to refocus the image if needed.



**IMPORTANT:** Ensure the Lens Height Adjustment Knob is securely fastened to avoid slipping on the Column. Slipping can cause a collision with the stage causing serious damage to the VM-100. Use the Limit Fixing Screw to help avoid this.

## 6.0 Image Software Operation

The VM-100 includes a built-in image processing software. some of features of this program are shown below, as well as how to navigate the interface.

### 6.1 Left Side Menu



#### Step 1: Power On VM-100

Power on the VM-100 using the power switch on the back of the unit

#### Step 2: Select Menu

Move the mouse cursor to the Left of the screen to raise the Main Menu Screen

#### Step 3: Image Setup

Click the gear icon (  ): Setup the image parameters using this menu. After setting, click the right mouse button to confirm settings. Select the X icon (  ) to go back to the Main Menu Screen.



This menu is used to toggle either automatic exposure or manual exposure. The Orange RESET icon is for returning to factory default settings.



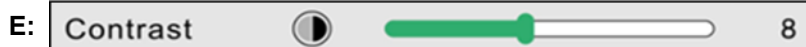
This menu provides the manual exposure time setting. The range is from 0 to 1000 ms.



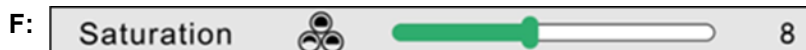
This menu provides the settings for automatic and manual white balance. The default is set to auto white balance. Selecting One Push will run auto balance once.



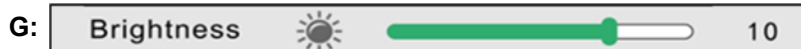
This menu provides power frequency selection mode (default is 50Hz)



This menu provides a slide to adjust contrast of the image

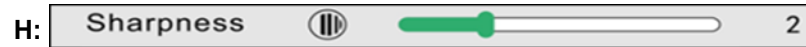


This menu provides a slide to adjust saturation of the image

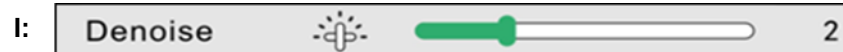


This menu provides a slide to adjust brightness of the image

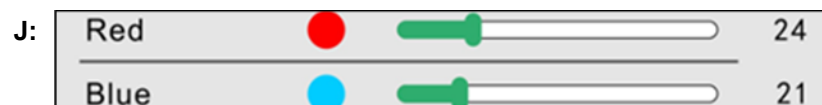
## 6.1 Left Side Menu Cont.



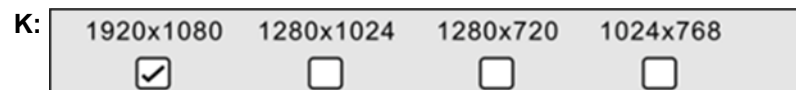
This menu provides a slide to adjust the sharpness of the image



This menu provides a slide to reduce or increase noise in the image



This menu provides a slide to adjust image gain (red or blue) for the image









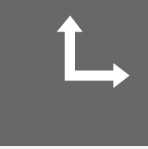



This menu allows selection of the resolution of the image (1920x1080 is the default)



## 6.2 Right Side Menu

### Step 4: Cross Line Menu

Move your mouse cursor to the right side of the screen to bring up the Reticle Menu. Use the reticle icon (  ) to place horizontal and vertical lines across the captured image. You can move lines by left clicking on the desired line and dragging to a different location. There are also buttons (described in the table) that are used to modify these lines.















<i>Icon</i>	<i>Meaning</i>	<i>Icon</i>	<i>Meaning</i>
	Preset reticle layout button: A/B/C/D/E/F/G/H total of 8 lines. Supports any user to modify/save.		Corresponding to the reticle: click to switch the 1~8 line. Where 1~4 is the horizontal line, and 5~8 is a vertical line.
	Hide Lines Button: Line 1 with 1-inch lines b-type layout, click the icon to hide Line 1 and other lines displayed in the layout type. Click to toggle		Cross-line adjust button: click to set the current line switches for coarse line, medium line, or fine lines.
	Cross-line color button: sets the current line color: red orange yellow green blue purple, grey.		Small movement on the right/upper of cross-line: click mouse and hold to move.
	Small movement on the left/lower of cross-line: click mouse and hold to move.		Cross-line(4 horizontal, 4 vertical) switch button.
	Cross-line settings save button: click on this icon to save the current line/cross-line layout settings.		



## 6.3 Bottom Menu

### Step 5: Main Menu

Move your mouse cursor to the bottom of the screen to access the main menu. This menu allows you to manipulate the direct image before image capture. This menu also has the feature to save the selected image currently displayed on the LCD monitor. Below is a table outlining each icon and its feature.

<i>Icon</i>	<i>Meaning</i>	<i>Icon</i>	<i>Meaning</i>
	Zoom In		Zoom Out
	Mirror Vertically		Mirror Horizontally
	Image freeze: After frozen, the other functions will not be available except "format SD card" and the "line settings", Click again to unfreeze.		Real-time image black and white switch
	Image reflecting suppression		Image real-time contrast functions: click the image/video to full screen, just move the mouse to the Center underside of the display click the icon returns.
	Real-time image save: click the icon to save the current image		Real-time video image save: click the video icon next to observe operations, click end and save videos.
	View the saved images/videos: click the image/video to full screen, just move the mouse to the Center underside of the display click the icon returns.		Format SD card: Please use this function sparingly, format the SD card will delete all users save images, videos, etc, deleted formatted content will not be repaired.
	Setting button		Cross-line set button: click on this icon to indicate the Center cross cursor and cross-line, and pop-up secondary menu. Click again to turn off this feature.

## 7.0 Trouble Shooting

Use this page to help with some issues that an operator could be experiencing. If this page is not helping solve an issue, call a PACE Technologies technical assistant.

<b>NO.</b>	<b>Problems</b>	<b>Cause</b>	<b>Solutions</b>
1	Poor visibility Image is blurry	Dirty Lens  Surface dust or dirty Focus is not correct	Clean the lens (see manual and maintenance)  Cleaning surfaces Adjust the focus
2	Head moves when adjusting focus	Focus wheel is too loose	Appropriately lock Coarse Adjustment Knob Tension Ring
3	Power light is not working	Power supply connection is bad	Check the power connections
4	No image on the monitor	VGA cable	Check the VGA cable connection
5	Incorrect image zoom	Monitor resolution settings	Moving the mouse pointer to the edge of the underside of the monitor (middle) button, select the appropriate resolution.
6	Sample not displaying on monitor	Samples are not placed correctly on the stage/sample surface is not vertical to the lens	Place samples in view on loading plate and/or use sample clips .
7	Hard to turn focus knobs	Tension becomes very tight	Relax Coarse Adjustment Knob Tension Ring