



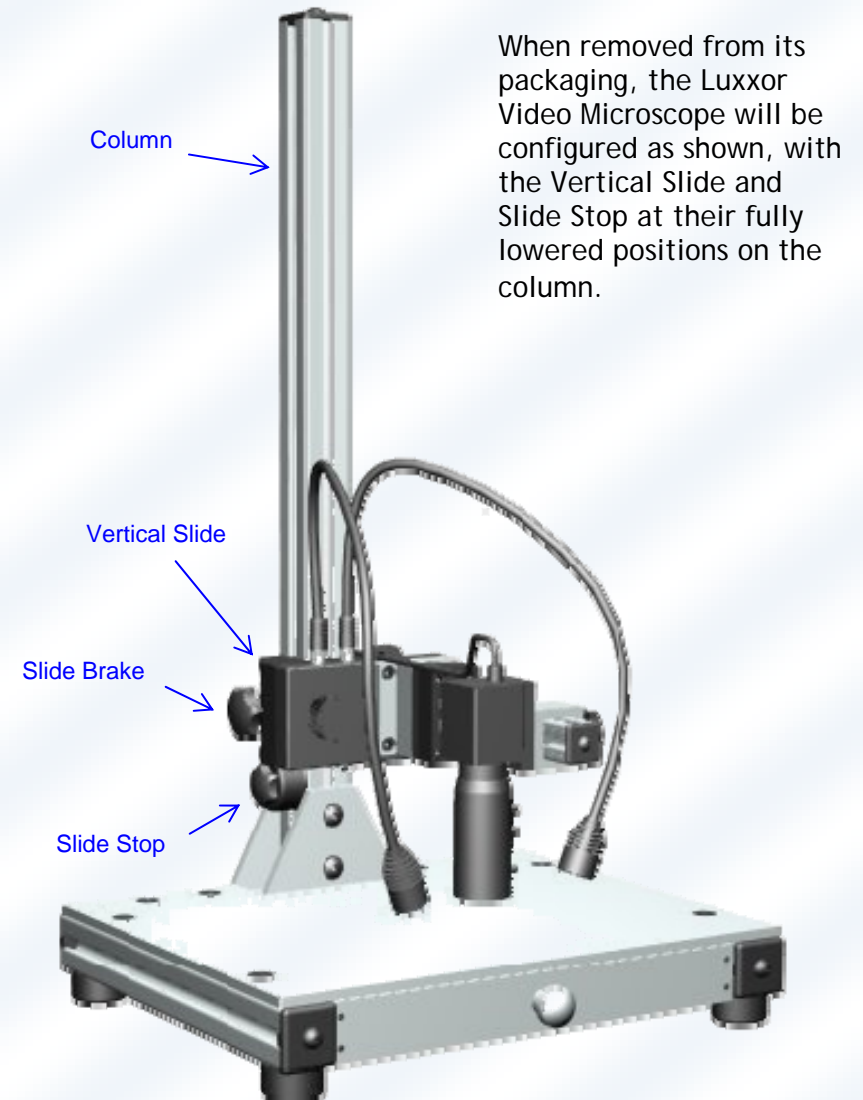
User Guide

LUXXOR[®] VIDEO MICROSCOPE



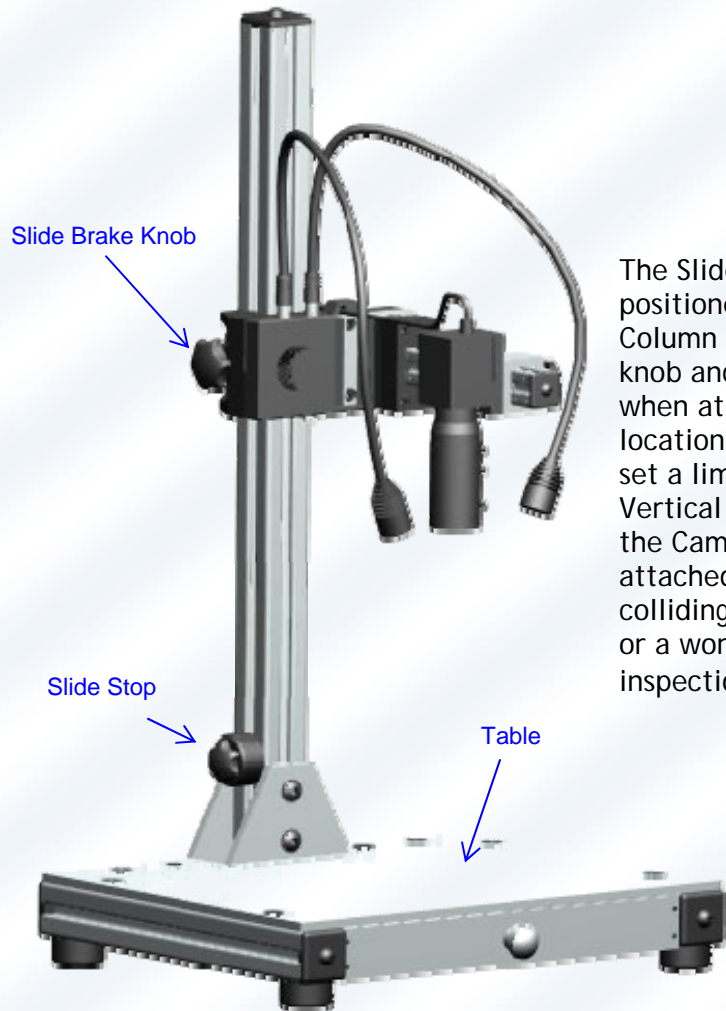
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Luxxor[®] Video Microscope - Set Up



Luxxor® Video Microscope - Set Up

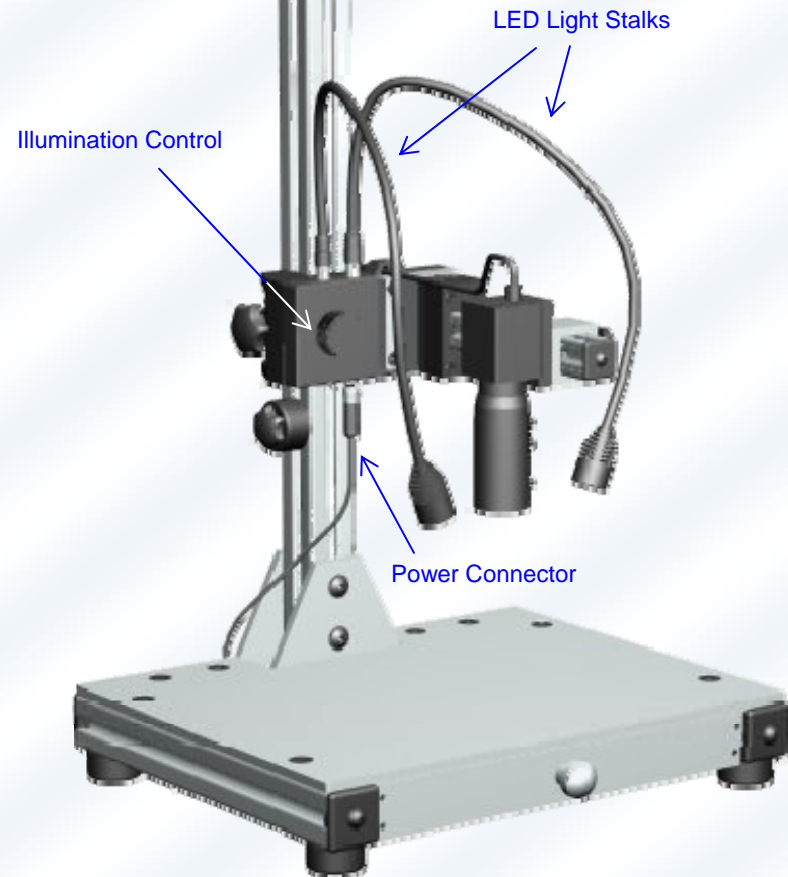
The Vertical Slide may be raised to the desired position on the Column by loosening the knob on the Slide Brake and lifting the Vertical Slide. Be sure to tighten the Slide Brake knob before letting go of the Vertical Slide.



The Slide Stop may be positioned along the Column by loosening its knob and re-tightening when at the desired location. Use this to set a limit for the Vertical Slide to avoid the Camera or an attached borescope colliding with the Table or a workpiece under inspection.

Luxxor® Video Microscope - Set Up

Plug the Power Connector at the end of the power supply cable into the jack on the bottom of the Vertical Slide. Tighten its locking ring to secure it in place. Then plug the power supply into a 110 VAC outlet. The Illumination Control may then be used to turn on the LED lights and vary their intensity. Make sure that both the light stalks are seated firmly in their sockets.



Luxxor® Video Microscope - Set Up

Remove the lens cap from the camera lens. Notice that the lens has three control rings, each having a locking knob. The locking knobs should be loosened to allow the control rings to turn. They can be tightened if you want the rings to stay in a certain position. The ring settings are read relative to the white dot index mark.

The upper ring controls the lens aperture. Opening the aperture (lower numbers) provides a brighter image with less depth of field.

The middle ring controls the zoom.

The lower ring controls the lens working distance. Set on Far, objects will be in focus about 4 inches from the lens. Set on Near, objects about 3 inches away are in focus.

For initial set-up, it is recommended to set the aperture wide open (4.5), the zoom at minimum (0.3) and the focus at Far.



Luxxor® Video Microscope - Set Up

Install Software and Drivers

Follow the instructions in the camera manual to install the camera driver and image capture software. The camera requires a computer running Windows 2000 or XP with a full speed USB 2.0 port. USB ports on a PCMCIA card may not be fast enough. Most modern built-in USB ports will work.

Initial Settings

With the camera and software installed, open the Video Toolbox program. Notice that a second window titled ZC Exposure Control also appears. For the initial set-up the ZC Exposure Control window should be set as follows:

The "Auto-exposure" box is checked.

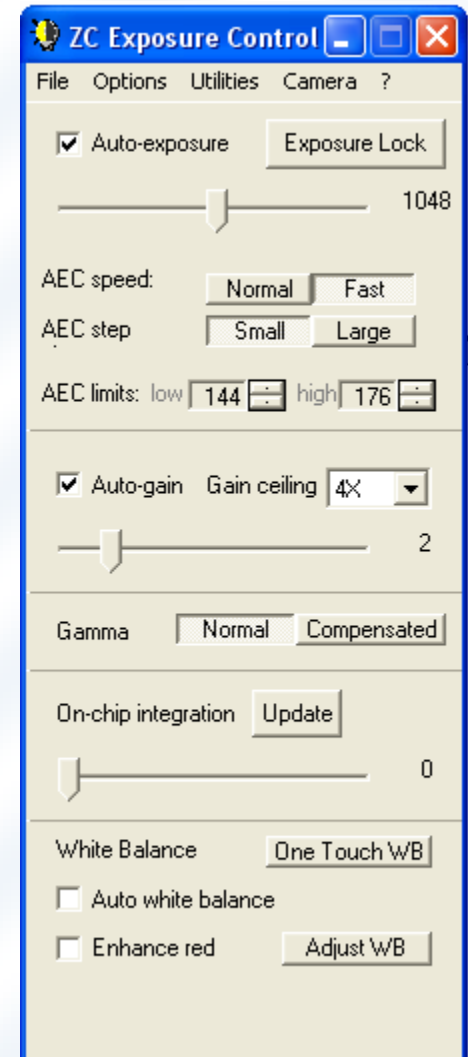
The "Auto-gain" box is checked.

"Gain ceiling" is set to 4X.

The "Auto white balance" and "Enhance red" boxes are unchecked.

Set White Balance

Place a piece of white paper under the camera lens so that it fills the field of view. It does not need to be in focus.

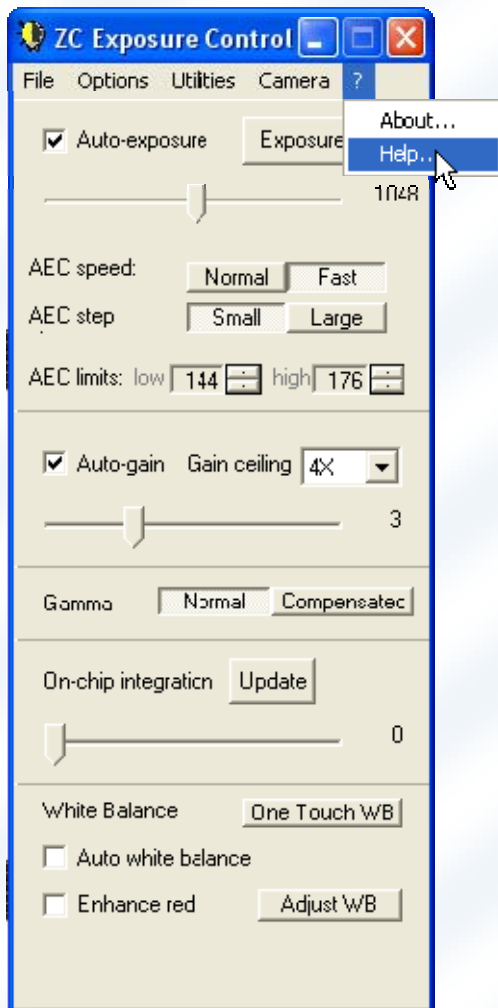


Luxxor® Video Microscope - Set Up

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Set White Balance (cont'd)

Check the "Auto white balance" box and wait a few seconds if necessary until the image turns white. Then uncheck the box. White balance should remain valid until the lighting is changed, such as when the LED lights are turned on or off. If the image color later seems wrong, repeat this procedure.

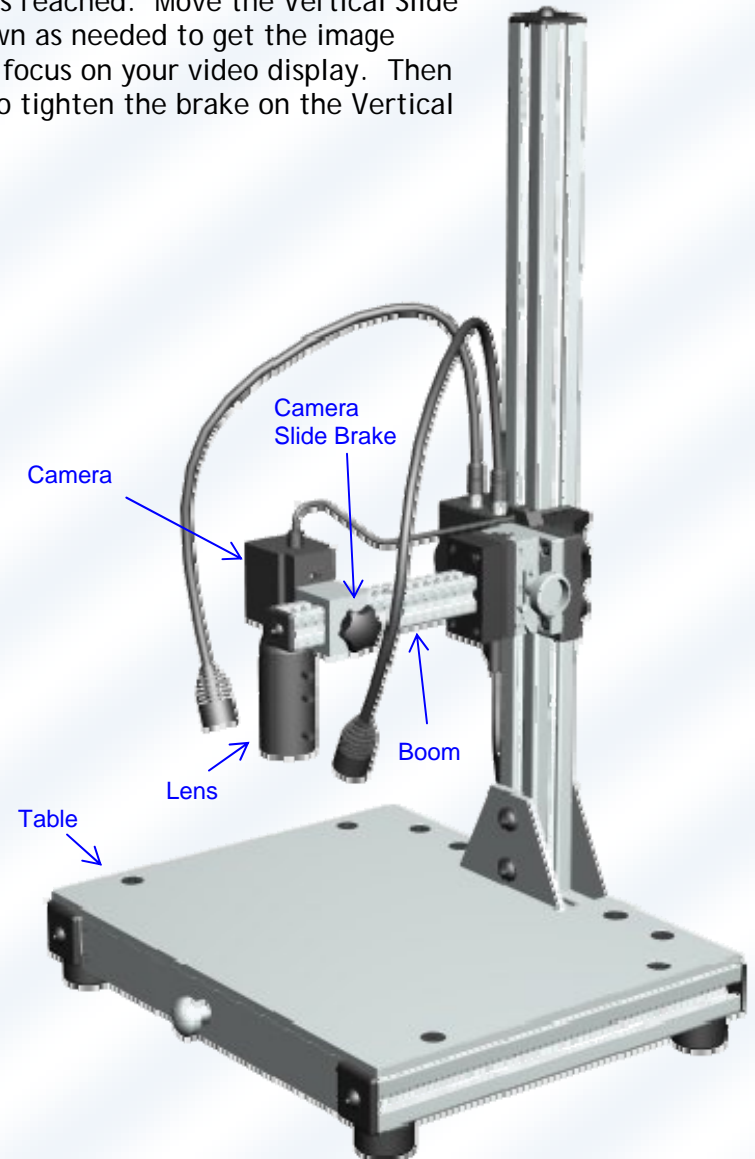


These settings should be good for starting out. More detailed information about the use of ZC Exposure Control can be found in the Help menu of the ZC Exposure Control window.

Luxxor® Video Microscope - Operation

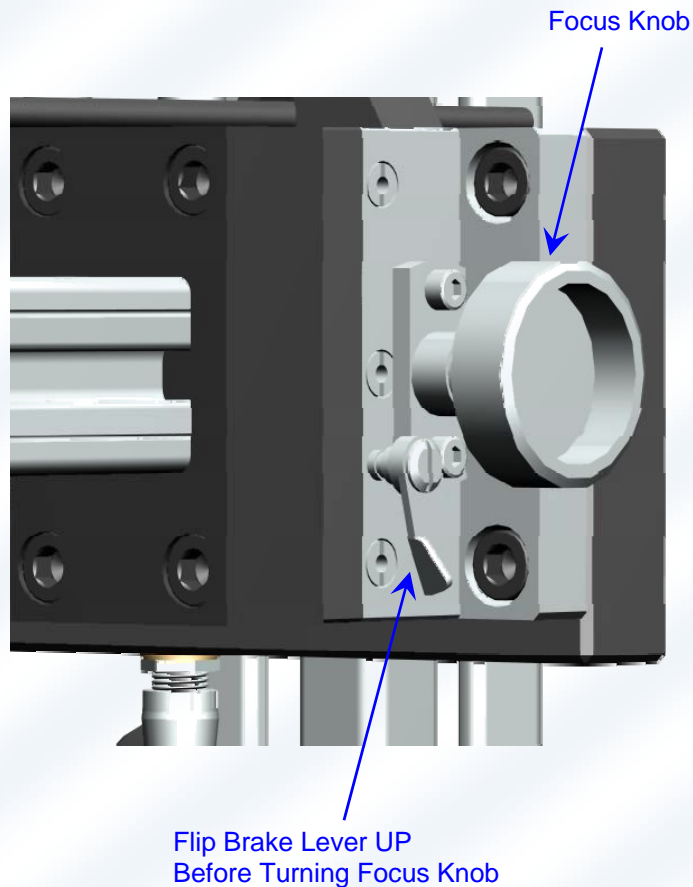
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Place the workpiece to be viewed on the Table under the camera Lens. The Camera may be slid along the Boom to align it with the part. To do this, Loosen the Camera Slide Brake, move the Camera and tighten the brake again when the desired position is reached. Move the Vertical Slide up or down as needed to get the image nearly in focus on your video display. Then be sure to tighten the brake on the Vertical Slide.



Luxxor® Video Microscope - Operation

Fine focus is achieved with the Focus Knob located on the side of the Vertical Slide, at the base of the Boom. **BE SURE TO RELEASE THE BRAKE LEVER BEFORE TURNING THE FOCUS KNOB.** The brake lever flips UP to release. Push the lever DOWN to lock the focus mechanism in place if desired.



Luxxor® Video Microscope - Operation

Once a focused image of the workpiece is obtained with the lens set to initial settings, further image modifications may be made by adjusting the control rings on the Camera Lens.

The **top ring** controls the aperture of the lens, thus affecting the brightness, resolution, and depth of field.

The aperture set wide open, at f/4.5 yields a brighter, higher resolution image with a very small depth of field. Closing the aperture to f/22 yields a darker, slightly lower resolution image, with a relatively large depth of field.

It is recommended to start with the lens at f/4.5 and obtain a well-focused image. Then decrease the aperture (increase the f-number) and observe the increase in the depth of field until it is satisfactory. As the aperture closes and the image gets darker, it may become necessary to provide more light by turning on the LED lights or increasing their intensity with the Illumination Control. The user must find the best compromise between brightness and depth of field in a given situation.

The **middle ring** controls the zoom (magnification).

The zoom range goes from 0.3X to 1X from the part to the CCD Imager inside the camera. This corresponds to 15X to 51X when the focus setting is on "Far" and the image is viewed on a 19" computer monitor with software Zoom set to 1X. (Changing the monitor size or resolution changes the magnification). The magnification can be increased by setting the focus ring at the bottom of the lens to the "Near" setting. Then the effective magnification range on a 19" monitor is 25X to 83X.

Luxxor® Video Microscope - Operation

The bottom ring controls the working distance from the lens to the object under inspection. Set at Far, the working distance will be about 4 inches. At Near, working distance will be about 3 inches. This mechanism should **not** be used for general focusing as it also changes the magnification. If the magnification changes, any measurement calibration that has been set will be invalid and have to be re-done. Set the position of the ring to Far to get 15X to 51X magnification, or to Near to get 25 X to 83X. once you choose a setting, tighten the Locking Knob so that it does not accidentally move.

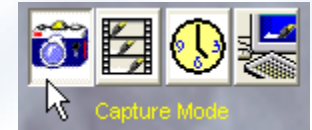
For focusing, ALWAYS move the Vertical Slide up and down the Column for coarse focus and use the silver Focus Knob on the right side of the Vertical Slide for fine focus.

Luxxor® Video Microscope - Image Capture

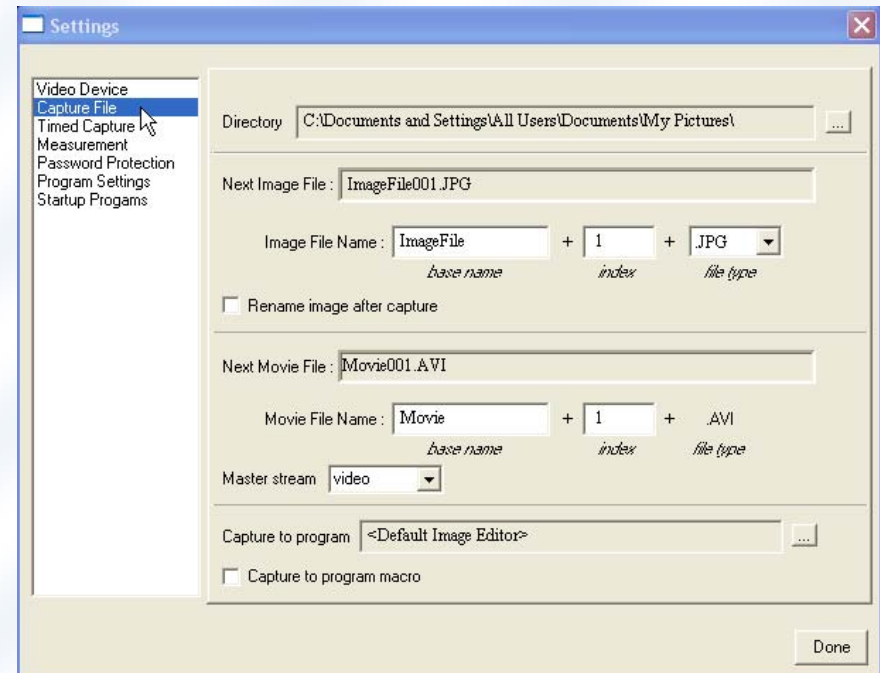
Setting Up Image Capture

In order to set up Video Toolbox for capturing images, do the following:

1/ Click the camera button at the far left of the Video Toolbox menu bar. This selects Still Photo mode. The film icon selects movie mode, the clock icon selects time-lapse movie mode and the computer icon stores still images to a file and then opens them in the image editing program of your choice.



2/ Click the Settings button in the Video Toolbox menu bar. A new window will open.

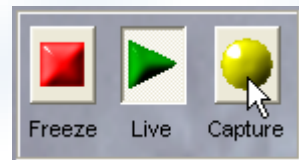


Luxxor® Video Microscope - Image Capture

Setting Up Image Capture (cont'd)

- 3/ Click "Capture File" on the left.
- 4/ Choose the directory you want to save the images in.
- 5/ Enter the root file name you want. Video Toolbox will append index numbers to the root file name.
- 6/ Choose the file type you want images saved as. The choices are bitmap, jpeg and tiff.
- 7/ Click the Done button at the bottom of the window.

Now the image displayed on the monitor can be captured by clicking on the Capture button at the right of the Video Toolbox menu bar. It will be automatically saved to the directory you chose.



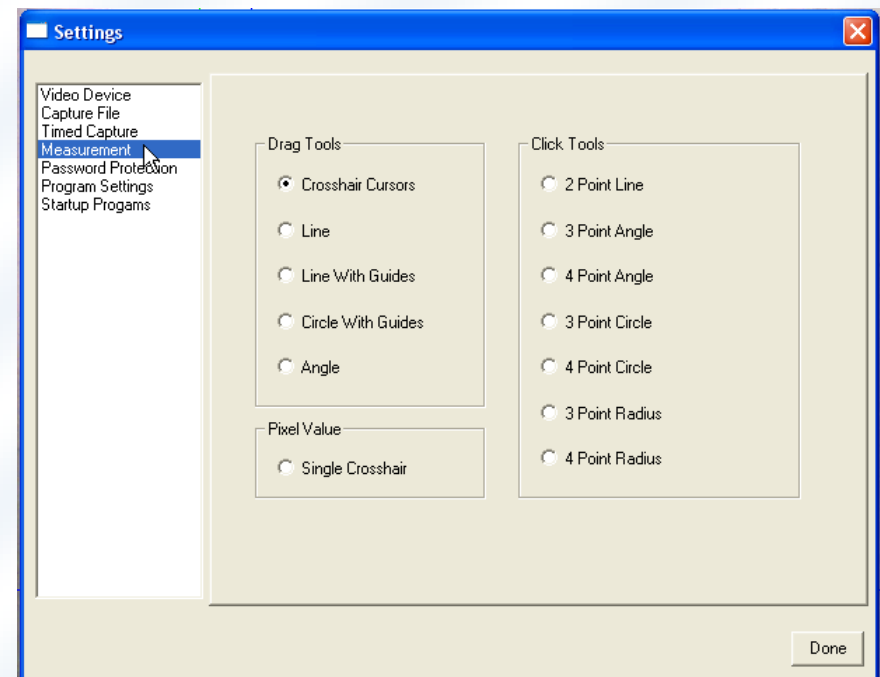
Luxxor® Video Microscope - Measurement

Calibration

To calibrate the microscope for measuring:

- 1/ Place the workpiece to be measured under the lens. Focus on the area of interest and set the zoom and working distance rings on the lens to provide the desired view.
- 2/ **LOCK DOWN THE ZOOM & WORKING DISTANCE RINGS.** If the magnification changes due to moving either of these rings, the calibration is no longer valid and the microscope must be recalibrated.

- 3/ Click the Settings button in the Video Toolbox menu bar. Click "Measurement" on the left. Select "Crosshair Cursors", then click the Done button.



Luxxor® Video Microscope - Measurement

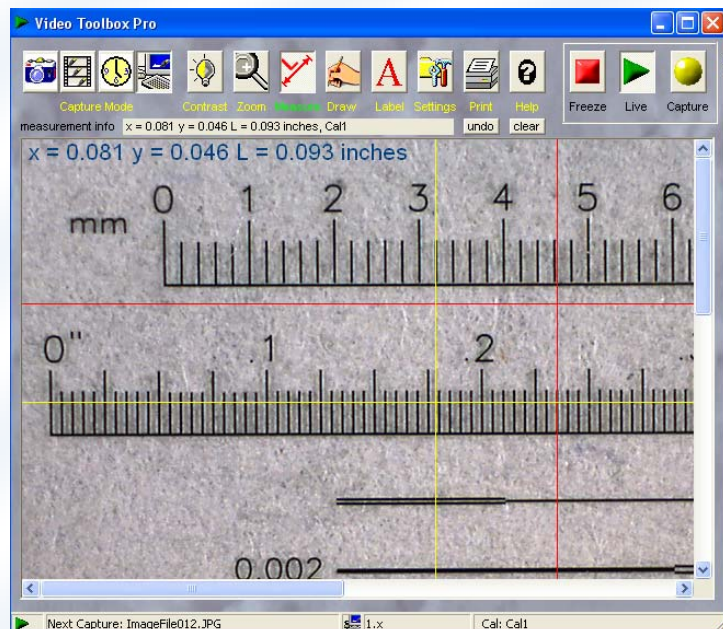
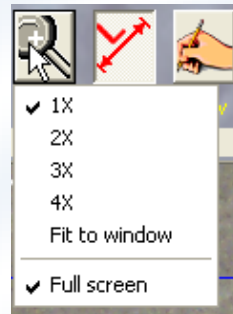
Calibration (cont'd)

4/ Remove the workpiece from the Table and place the Calibration Reticle supplied with the Video Microscope under the lens, with a white piece of paper under it.

5/ Focus on the Calibration Reticle without disturbing the zoom or working distance rings on the lens. Use only the Vertical Slide for coarse focus and the silver Focus Knob for fine focus.

6/ Click on the Zoom button on the Video Toolbox menu bar. Make sure 1X, 2X, 3X or 4X is chosen, but NOT "Fit to Window". 1X is the recommended setting.

7/ Click on the Measure button on the Video Toolbox menu bar. This will display the measurement cursors on the image, as well as the measurement readout at the upper-left of the image.

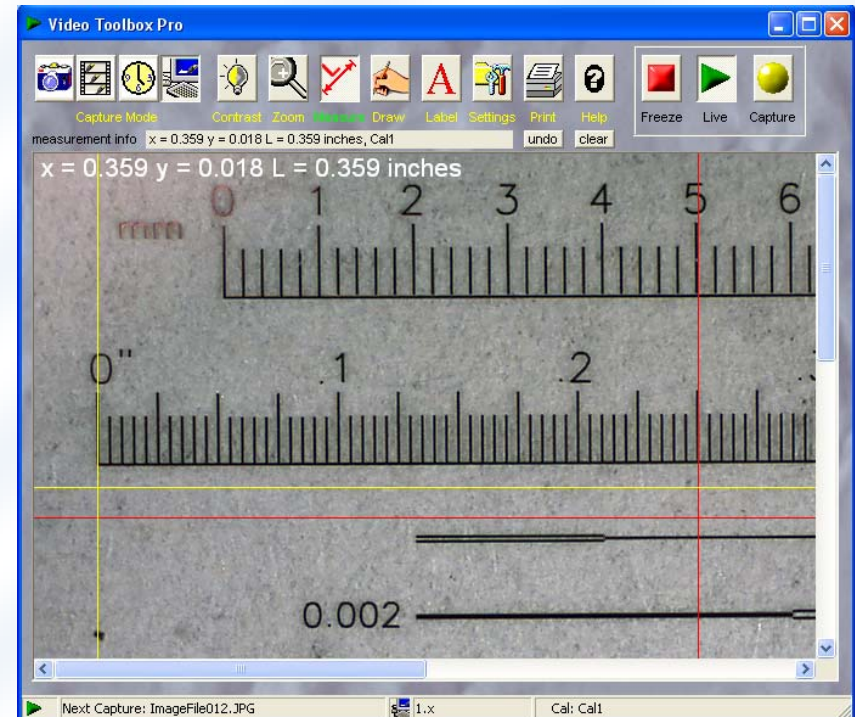


Luxxor® Video Microscope - Measurement

Calibration (cont'd)

8/ Decide whether to calibrate in inches or millimeters. Then choose the appropriate scale on the Calibration Reticle. Move the cursors so that their respective vertical lines are aligned with convenient marks on the scale as widely separated as possible.

Note that in order to drag an individual cursor, it must be grabbed at the intersection of its two axes. If grabbed elsewhere, both cursors will be dragged together.



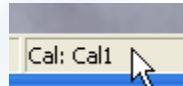
Shown here is the yellow cursor's vertical line aligned with '0' on the inch scale and the reds cursor's vertical line aligned with .250 in.

Luxxor® Video Microscope - Measurement

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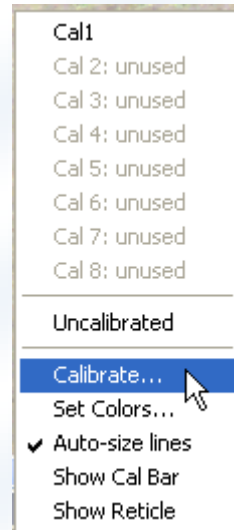
Calibration (cont'd)

9/ With the measurement cursors aligned on the Calibration Reticle, click in the calibration bar at the bottom of the Video Toolbox window.



Select Calibrate from the menu that appears.

(Note that cursor and text colors may be changed by choosing Set Colors from this menu.)

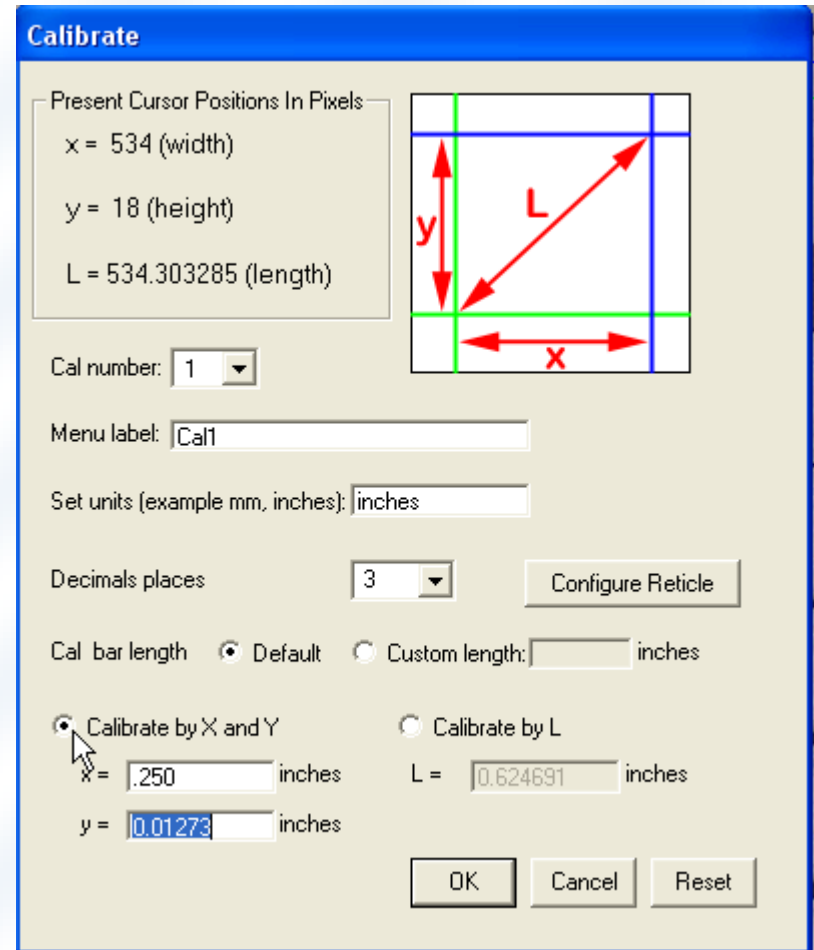


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Luxxor® Video Microscope - Measurement

Calibration (cont'd)

9/ Select 'Calibrate by X and Y' in the lower-left of the window that appears.

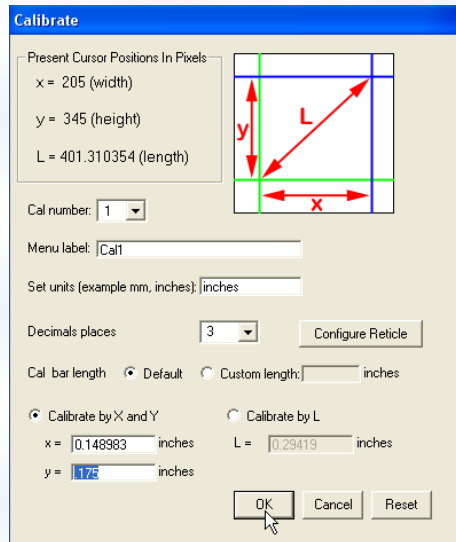
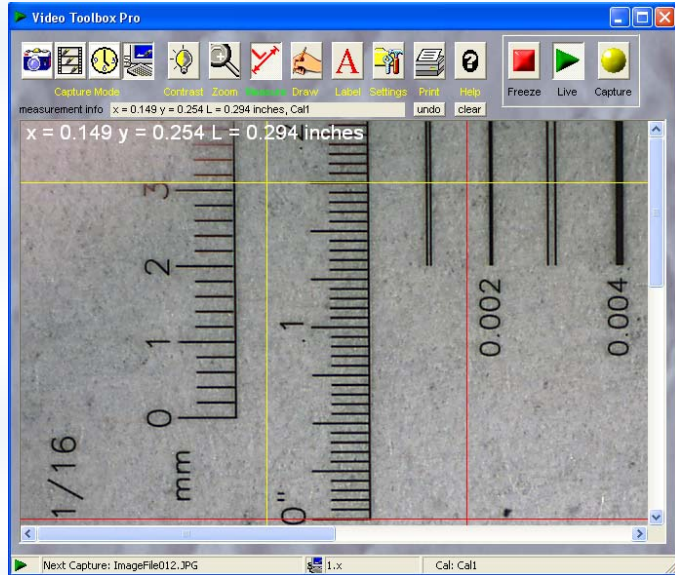


Enter "in" or "inches" in the 'Set units' box, (or mm if appropriate). Then enter the scale reading (.250 in this case) in the 'x=' box. Then select 'OK'.

Luxxor[®] Video Microscope - Measurement

Calibration (cont'd)

Now rotate the Calibration Reticle so that the desired scale is oriented vertically as shown here. Repeat the above procedure, this time aligning the cursors' horizontal lines with widely separated marks on the reticle.



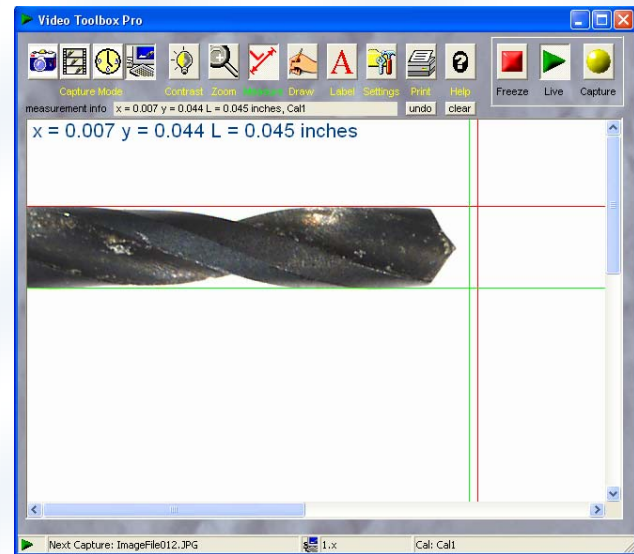
Go to the Calibrate menu as above and enter the scale reading in the 'y=' box. Then click 'OK'.

Luxxor[®] Video Microscope - Measurement

Measurement

The microscope is now calibrated and ready to measure. Replace the workpiece on the Table, refocus the image using the coarse and fine focus only. Do not change the magnification.

Use the crosshair cursors to measure any visible feature. Here the drill bit measures .044 inches in diameter.



Changing the focus with the Vertical Slide and Focus Knob for different areas of interest or different parts is OK as long as the magnification remains the same.

Other cursors may be selected by clicking the Settings button on the toolbar, selecting 'Measurement' at the left and choosing an alternate cursor style from the list. Calibration should remain valid after changing cursors.

If the Zoom ring or Working Distance ring is moved, calibration must be re-done.

Luxxor® Video Microscope

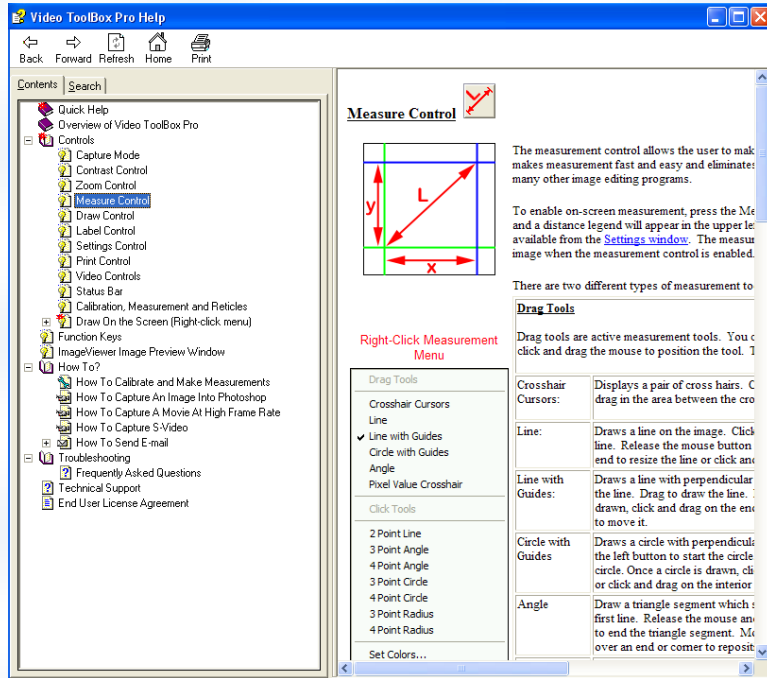
More help can be found in the Video Toolbox Help files. Click the Help button on the toolbar.



Then choose Open Help File from the window that appears.

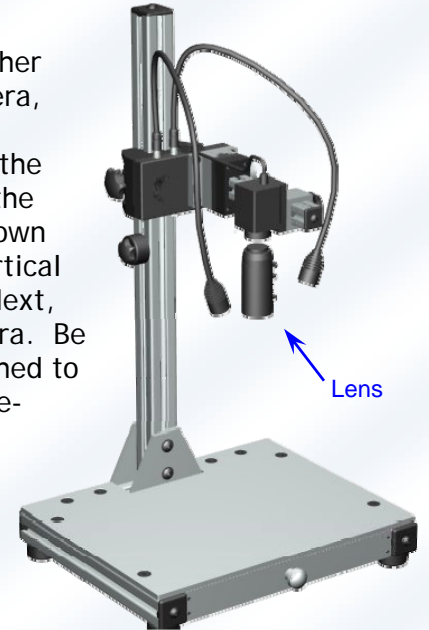


Choose a help topic.

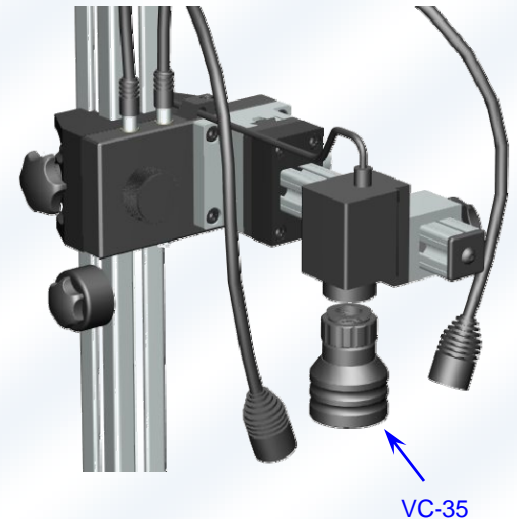


Luxxor® Video Microscope - Borescope Mounting

To mount a Hawkeye® or most other brands of borescope to the Camera, first raise the Vertical slide high enough to provide clearance for the borescope and part and tighten the brake. Then position and lock down the Slide Stop to prevent the Vertical Slide from descending too far. Next, unscrew the Lens from the camera. Be sure the knurled ring stays attached to the Camera. If it comes loose, re-thread it onto the Camera.

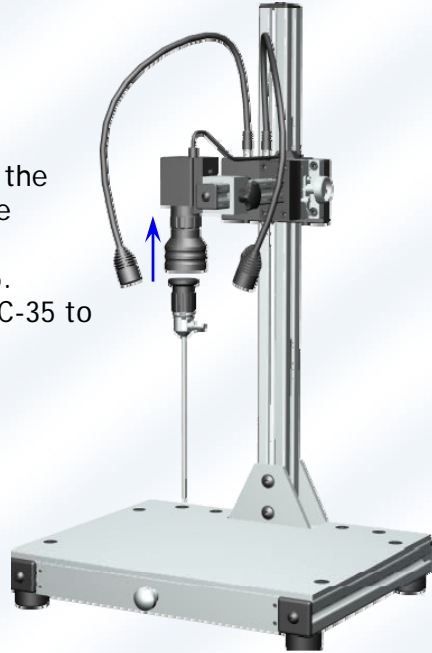


Now thread the VC-35 onto the Camera.



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Luxxor® Video Microscope - Borescope Mounting

With the VC-35 mounted, pull the bell of the VC-35 upward while inserting the eyecup of the borescope fully into the VC-35. Then release the bell of the VC-35 to lock the borescope in place.

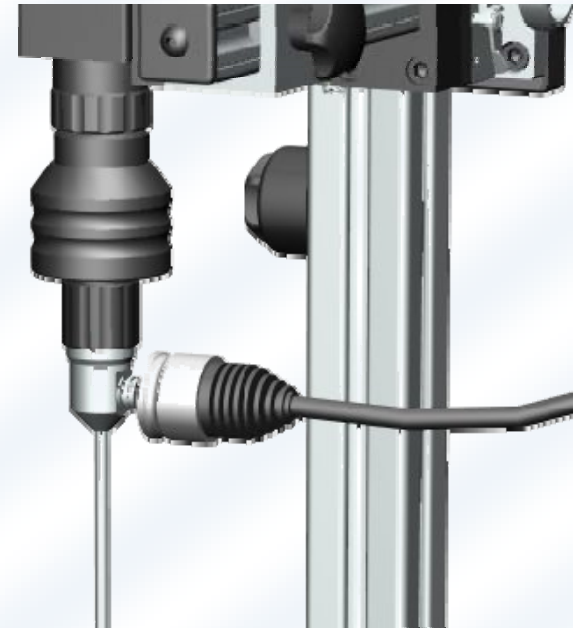
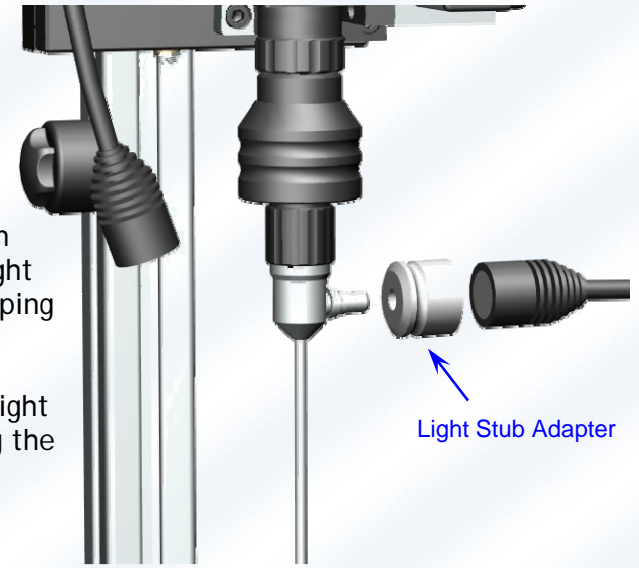


The mounted borescope will look similar to this.



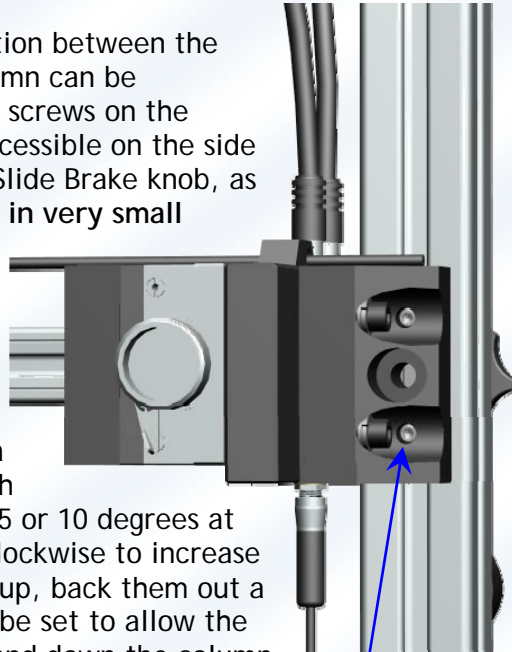
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Luxxor® Video Microscope - Borescope Mounting

Light may be provided through the Hawkeye® borescope (and many others) from one of the LED Light Stalks by first slipping the Light Stub Adapter over the head of the LED Light Stalk, then sliding the adapter onto the light stub of the borescope.



Luxxor® Video Microscope - Maintenance

The amount of friction between the Vertical Slide and the Column can be adjusted. The adjustment screws on the Vertical Slide are easily accessible on the side of the slides opposite the Slide Brake knob, as shown here. **Adjust these in very small increments as they are quite sensitive.** First, while holding the Vertical slide by hand, or letting it rest against the Slide Stop, **loosen the slide brake.** Then, using a 1/8-inch hex key, turn both screws equally only about 5 or 10 degrees at a time. Turn the screws clockwise to increase friction. If the slide locks up, back them out a little. The friction should be set to allow the Vertical Slide to move up and down the column smoothly by hand, but not fall when the brake is loosened.



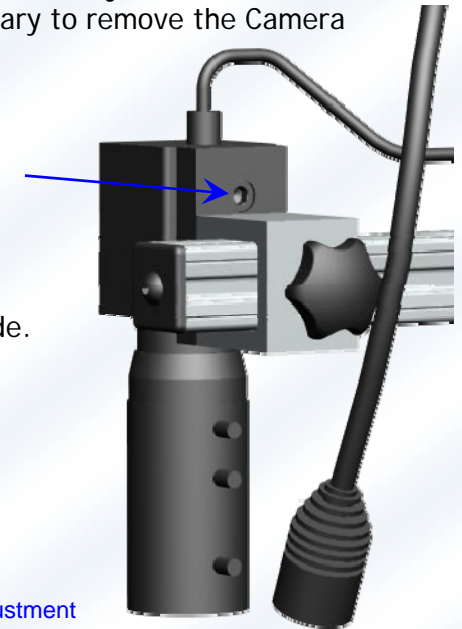
Adjustment
Screws (2)

Luxxor® Video Microscope - Maintenance

The friction between the Camera Slide and the Boom may also be adjusted. To access the friction adjustment screw on the Camera Slide, it is first necessary to remove the Camera from its mounting block.

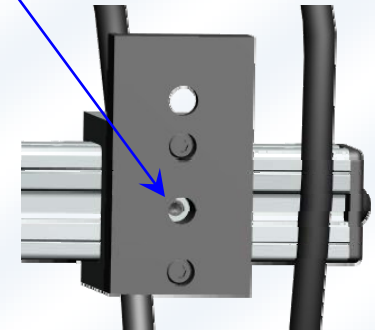
Camera Mounting Screw

Remove the Camera Mounting Screw and set the Camera aside.



Adjustment
Screw

Loosen the slide's brake and use a 3/32-inch hex key to make adjustments. Again, clockwise tightens and increases friction. Adjust in 5 or 10 degree increments until the desired resistance to motion is felt in the slide. Tighten the brake and replace the Camera on its mounting block.



Working Distance - Adjustable from 72 to 96mm.

Resolution and Field of View

Working Distance	Minimum Zoom		Maximum Zoom	
	Field of View (H x V)(in.)	Resolution (in./pixel)	Field of View (H x V)(in.)	Resolution (in./pixel)
FAR (96mm)	0.97 x 0.75	0.00083	0.29 x 0.23	0.00024
NEAR (72mm)	0.59 x 0.47	0.00050	0.18 x 0.14	0.00014



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