1. Introduction

The PriorLab and PriorLux upright compound microscopes are high quality instruments equipped with high resolution, chromatically corrected optics for excellent image quality. The robust construction and hard wearing materials ensure long lasting and trouble free operation. The instrument can be used with a number of accessories allowing brightfield, dark ground, phase contrast and polarising contrast observations.

For documentation, both instruments are available with a trinocular head which permits mounting of a video or digital camera system.

2. Unpacking

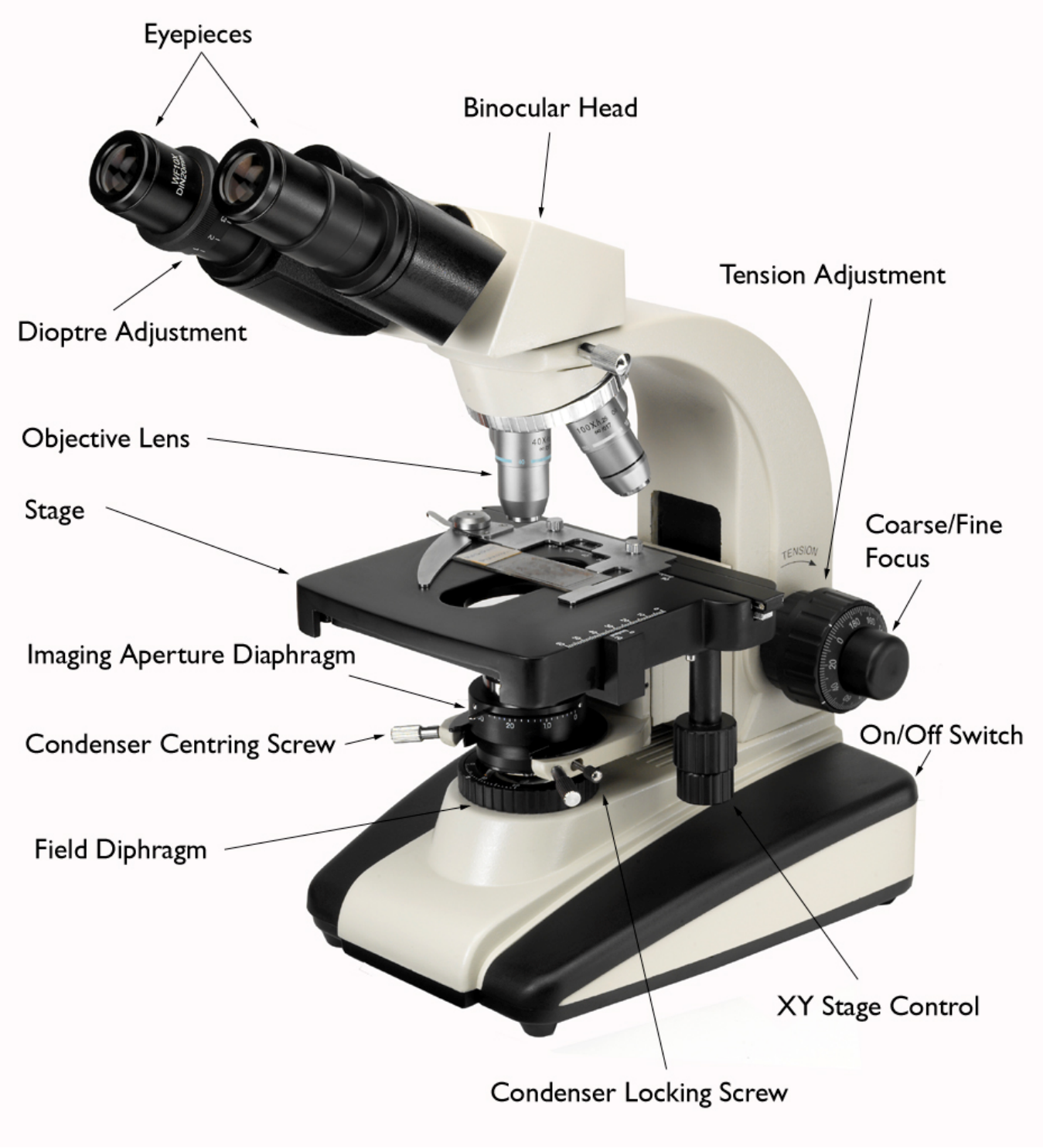
The PriorLab / PriorLux is shipped in protective bags within a pre-formed container. Each component should be carefully unpacked and checked, cutting rather than tearing the plastic bags. The head (binocular or trinocular) should be fitted to the dovetail on top of the stand and locked in place with the head locking screw. The eyepieces then just drop into the eyepiece tubes at the front of the head, these should be pushed in as far as they will go.

Remove each objective lens from its protective “pot” and screw into the free positions on the nosepiece. Move the stage and the condenser carrier to the highest position and insert the condenser from underneath with the diaphragm control facing to the front. This is locked in position with the clamping screw, which is fitted from the side.

3. Specifications

	PriorLab			PriorLux		
Eyepieces	10x 18mm field of view			10x 20mm field of view		
Condenser	Abbe NA 1.25 with iris diaphragm and filter holder			Abbe NA 1.25 with iris diaphragm and filter holder		
Mechanical Stage	Dimensions – 185mm x 145mm Movement – 75mm x 55mm			Dimensions – 185mm x 145mm Movement – 75mm x 55mm		
Focusing Mechanism	Co-axial fine and coarse adjustment with tension control and focus stop			Co-axial fine and coarse adjustment with tension control and focus stop		
Viewing Head	Interpupillary distance 55-75mm			Interpupillary distance 55-75mm		
Kohler Illumination	12V 30W halogen lamp with variable brightness control			12V 30W halogen lamp with variable brightness control		
Power Supply	220/240 VAC 50Hz and 110 VAC 60Hz. Universal input voltage			220/240 VAC 50Hz and 110 VAC 60Hz. Universal input voltage		
Objectives	Mag.	NA	Tube Length	Mag.	NA	Tube Length
	4x	0.12	160mm	4x	0.12	∞
	10x	0.25	160mm	10x	0.25	∞
	40x (S)	0.65	160mm	40x (S)	0.65	∞
	100x (S)	1.25	160mm	100x (S)	1.25	∞

4. Component Parts



5. Electrical Connection and Safety

Stands are supplied with an operating voltage of either 220/240 VAC 50/60Hz or 110/120 VAC 50/60Hz. The instrument is supplied with a power lead complete with appropriate plug for mains connection. UK plugs are fitted with a 3A fuse. This should only be replaced with a similarly rated fuse. The instrument should ALWAYS be switched off and isolated from the mains before any lamp or fuse is changed. The internal fuse is a T1.25A type (replacement code W335). If necessary, replace only with this type of fuse.

6. Setting Up

Connect the power cable to the base of the microscope, at the rear, and before switching on the power, reduce the lamp intensity control to its minimum setting. After switching on, the intensity should be increased to a comfortable level. This procedure should be reversed before switching off. Following this method will considerably prolong the life of the bulb.

Binocular/Trinocular Head

Interpupiliary distance should be set by rotating both eyepiece tubes in an arc until the two images coincide and the view is perfectly circular to both eyes. Note the value on the scale between the eyepieces so that the position can quickly be regained for future viewing. Place a specimen on the stage and focus the image while looking through only the right eyepiece. When the specimen is in focus close the right eye and adjust the dioptre on the left eyepiece so that the image is perfectly focused. The instrument is now balanced for your eyes.

7. Setting Köhler Illumination

A. Follow the procedure in section 6 to set up the instrument for your eyesight.

B. With a specimen in sharp focus using the 10x objective, close the field diaphragm until it impinges on the field of view, Figure 1, Picture A.

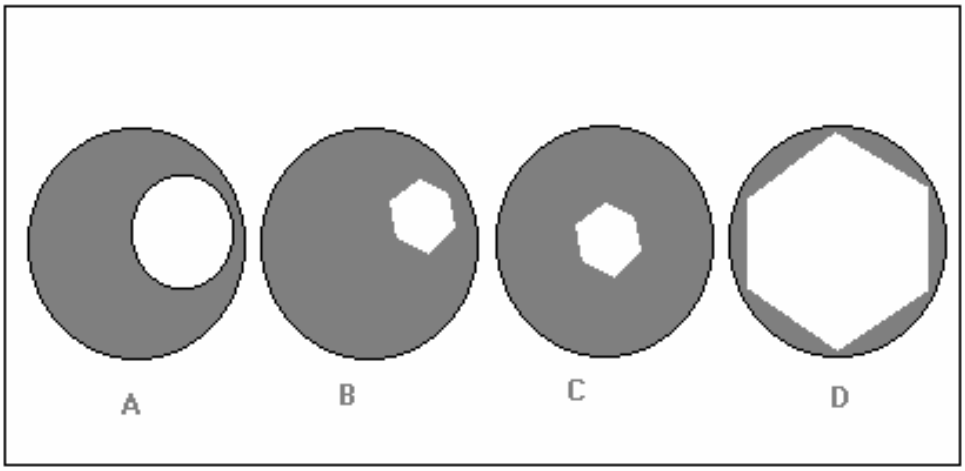


Figure 1

C. Focus the condenser using the side mounted rack and pinion controls until the leaves of the diaphragm are in sharp focus, Figure 1, Picture B.

D. Using the condenser centration controls move the diaphragm into the centre of the field of view, it may help to open it until it is nearly touching the outside of the field to attain perfect centration, Figure 1, Pictures C & D.

E. Fully open the field diaphragm.

F. Fully open the condenser diaphragm and then slowly close it until you see the contrast within the image increase. If you then remove an eyepiece and look directly down the tube from a distance of 20-30cm you should see an image similar to picture D in Figure 1. The aim here is to have the “bright” area occupying approximately 70% of the total field. The amount it occupies will change dependant on the objective lens in use. If you have set up the instrument using the 10x objective (recommended) then as you increase the magnification this diaphragm will need opening to optimise the contrast and resolution. Often it is set for the objective which is either most frequently used or most critical in terms of resolution and left in that position

G. Oil Immersion Objectives Only

For oil immersion lenses, make sure that a part of the specimen is in the centre of the field of view as seen with the last dry objective used. Rack the nosepiece up slightly, swing the dry lens to one side, rotate the 100x oil immersion lens over the specimen ensuring that it clears the cover-slip. If there is insufficient clearance, rack the nosepiece up further. Lower the lens close to the slide and then rotate it slightly to one side. Place a drop of immersion oil (free of air bubbles) on the specimen and gently rotate the lens into the drop. Using the fine focus knob, focus the image. Proceed as before through steps B to F. Finally, set the focus stop to ensure that the front lens of the objective does not touch the slide.

Remove residual oil from the objective after use.

8. Cleaning Objectives

It is critical that the front lens of each objective is kept clean and free of contamination. Any dust or dried immersion oil will seriously affect the image quality attainable with that objective. If contamination is suspected then the easiest way to confirm this is by removing the objective lens and examining the front lens using the eyepiece. To do this take out one of the eyepieces, turn it around so that you are looking the wrong way through it and move it towards the front of the objective until you can focus on the front lens. This will clearly show any contamination. To remove dirt and oil a lens cloth, lens tissue or cotton bud dampened with industrial alcohol can be used. A spiral motion starting from the centre of the lens moving to the outside is the best way of achieving a thoroughly clean surface

9. Phase Contrast

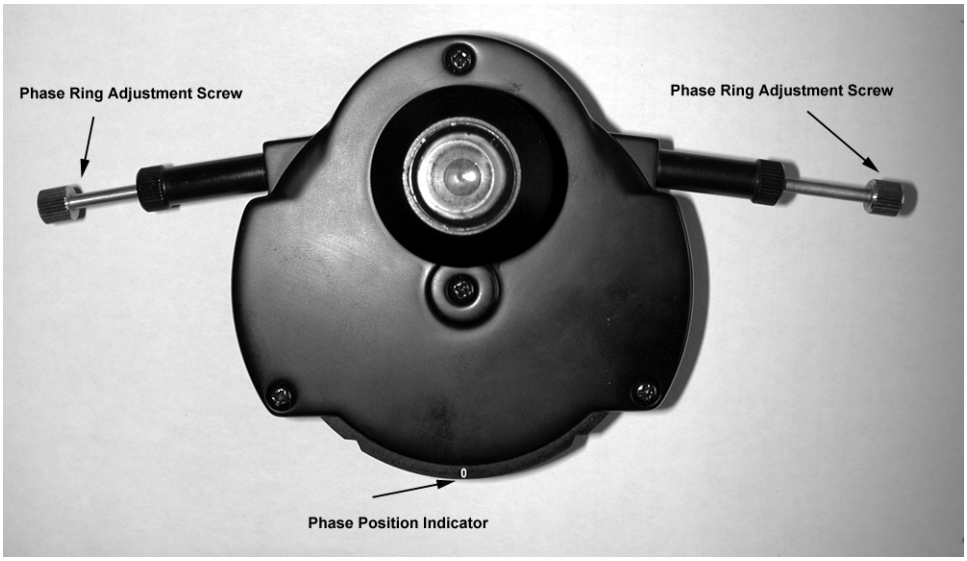
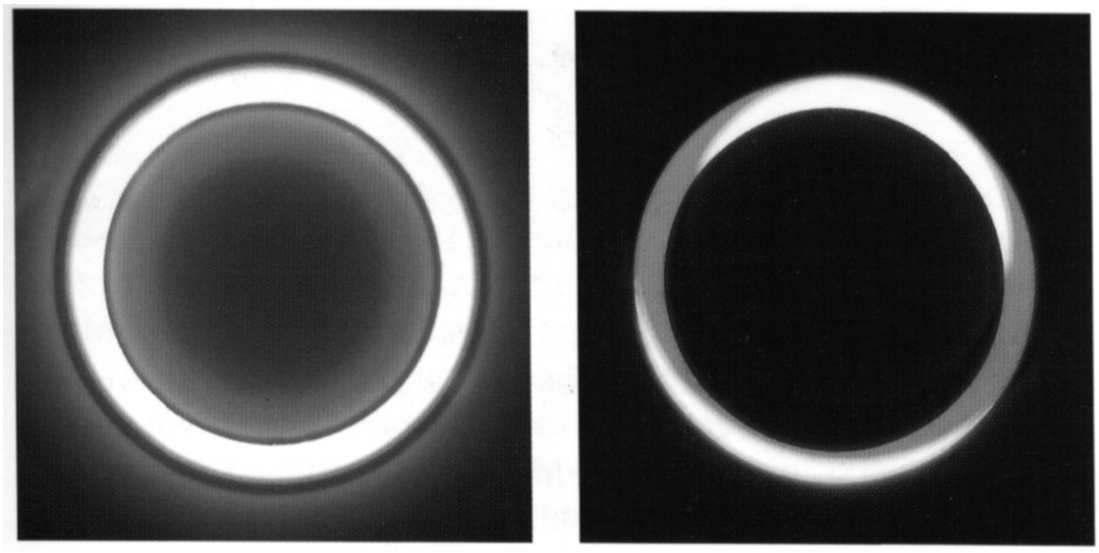


Figure 2

Phase contrast is a technique used to amplify contrast in unstained samples. To be able to see objects with phase contrast the optional phase kit is required. This includes a phase turret condenser (see figure 2), phase objectives, a centering telescope and a green filter. Firstly the standard condenser must be removed by loosening the retaining screw and the phase turret condenser installed in its place. Swap the standard objectives (if you have them) for phase contrast objectives, these are engraved PH, and select the correct condenser position (0 for brightfield, 10 for the 10x objective, 20 for the 20x objective etc.) Follow the steps in section 7 to ensure that Köhler illumination is set up properly. Remove an eyepiece and insert the centering telescope, this allows you to focus on the phase rings and make adjustments to their alignment. The two rings, one bright, one dark should overlap perfectly (A), if not (B) then their position relative to one another should be adjusted using the centration screws at the rear of the condenser (Figure 3).

To make adjustments to the phase ring alignment push in the adjustment screws and then turn. When the alignment is complete remember to pull the screws back out or it will be impossible to change condenser position.



A B

Figure 3

This procedure needs to be carried out for every objective, but unless deliberately adjusted should not need checking again frequently. If the quality of the phase contrast image is poor then check that the condenser is properly focused and centred and then ensure that the rings are correctly aligned.

10. Dark Ground

The microscope may be used for dark ground observations if the optional phase contrast condenser has been purchased. To use dark ground simply move the condenser position from brightfield (O) to dark ground (D) by rotating the condenser turret.

11. Using a Camera

The PriorLab / PriorLux microscopes, when fitted with a trinocular head, can be used with a range of cameras for documentation purposes. Video cameras, both analogue and digital provide ‘moving’ pictures for more advanced imaging applications, while digital ‘still’ cameras can be used for basic image capture.

Detailed instructions for the operation of the selected video or digital camera are supplied with the camera.

Assembly Video Cameras

A. Screw the c-mount adapter (part no. WXCM1 1.0x or WXCM050 0.5x) to the video camera

B. Loosen the knurled silver screw on the c-mount adapter and insert the adapter with the attached camera into the top of the photo tube on the trinocular head

C. Tighten the screw to secure the assembly

D. Connect camera to a PC, framegrabber or analogue monitor as required

E. To view the image via the camera, pull out the light path selector on the side of the trinocular head. This diverts 80% of the light to the camera and 20% to the eyepieces

Assembly Digital Cameras

This is similar to the assembly of video cameras above, but a digital coupler (part no. MZO1403 suitable for the Nikon Coolpix 4500 or the MZO5503 suitable for the Nikon Coolpix 5400) and a step down ring (part no. W3000) may also be required depending on the camera model used.

For more detailed set up information refer to the literature supplied with the camera.


Digital Camera
Step Down Adapter
Digital Coupler
1.0x C-Mount

12. Bulb Replacement and Adjustment

Halogen bulbs have a finite life and will need replacing from time to time. Replacement bulbs, part number W3257, are available from Prior Scientific.

To change the bulb;

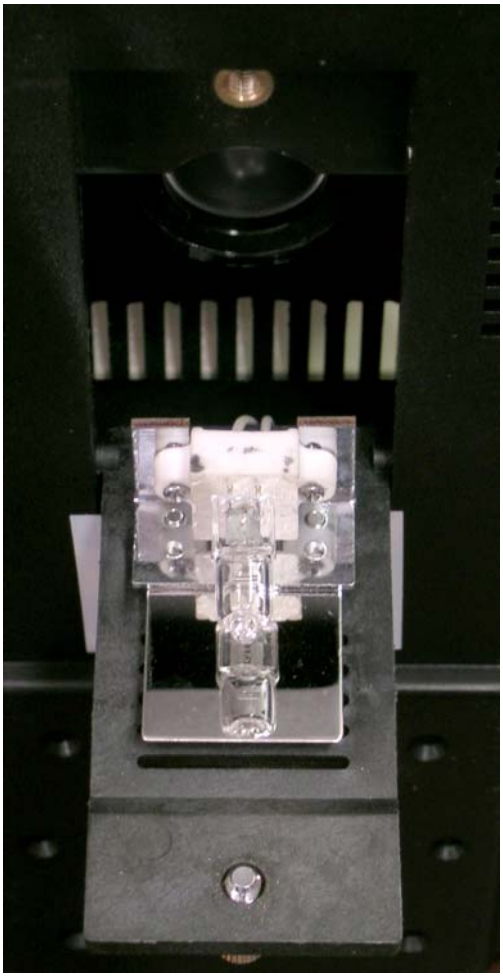
A. Switch off the microscope and isolate from the mains electrical supply

B. Remove the eyepieces from the viewing head to prevent them falling out

C. Lay the microscope on its back to gain access to the base plate

D. Loosen the screw which holds the lamp cover to the base plate

E. Open the lamp cover to expose the bulb holder



F. Remove the old bulb and replace it with the correct replacement bulb (part no. W3257, 12V 30W push fit double pin type) by sliding upwards in its holder. Do not handle the bulb with bare fingers, hold it in a piece of paper tissue or in the bulb wrapping material. Finger marks can cause contamination which blackens the bulb when it is switched on. If the bulb has been touched with the fingers, clean it with a tissue moistened with alcohol.

13. Fuse Location

The fuse is located on the base towards the front right corner of the instrument.

14. Spare Parts

W3257 – Spare bulb 12V 30W Halogen

W335 – Fuse T1.25A

15. Safety Precautions

The following symbols have been used on this microscope

These symbols are found next to the bulb access door on the underside of the instrument.

Warning High voltage, disconnect power supply before changing the bulb.

This symbol is located next to the bulb access door on the underside of the instrument

Caution Hot surface, allow surface and bulb to cool down completely before attempting to change the bulb.

16. Regulatory Compliance

Complies to the following standards

EN/IEC 61010-1:2001 Safety requirements for electrical equipment for measurement, control, and laboratory use – part 1: General requirements

EN61326:1997 (+A1/A2/A3) Electrical equipment for measurement, control and laboratory use – EMC requirements

Class B emmisions

EN61326:1997 (+A1/A2/A3) Electrical equipment for measurement, control and laboratory use – EMC requirements

General immunity

CFR 47 : 2004 class A Code of federal regulations pt 15subpart B – Radio frequency devices – unintentional radiators

17.