VAN GUARD®

Microscopes

Operation Manual

1200CM Series

Covering Models:

1210CM, 1211CM, 1220CM, 1221CM, 1222CM, 1223CM, 1230CM, 1231CM, 1232CM, & 1233CM

Introduction

Thank you for purchasing this VanGuard Microscope. With the user in mind, VanGuard Microscopes are built from modern designs and should provide a lifetime of reliable performance. We recommend you read this entire manual carefully before setting up and using the instrument.

1200CM Series Compound Microscopes

VanGuard 1200CM Series Compound Microscopes provide the necessary specifications for diagnostic and educational use in medical/veterinary clinics, universities, and industrial laboratories.

- **Research Level**
- **Brightfield & Phase Contrast Models**
- **Precision Optics**

Viewing Head. Monocular, binocular (Seidentopf), or trinocular (Seidentopf) heads rotate 360° and are inclined at 30°. All models feature interpupillary and dioptric adjustment. The trinocular heads feature a sliding main prism (100/100 split) to provide either 100% of the image to the camera port or 100% of the image to the eyepieces.

Eyepieces. 10X widefield (DIN) with a field number of 18.

Nosepiece. Quadruple, reversed, ball bearing nosepiece with high-grade lubricant and positive stops. The nosepiece is reversed (inward-facing) to allow for easier manipulation of slides and to aid in keeping the objectives clean.

Objectives. Choose from achromatic or plan achromatic. Objectives are made to DIN standards and are coated.

Stage. Delivering a high level of fluid motion control and longevity, the stage measures 125x135mm. Features a removable spring-clip slide holder and a chemical resistant finish. Motion is controlled by a right-hand, low position coaxial control and is driven by a rack and pinion system.

Focusing Movement. Coaxial, low-position, coarse and fine focus controls feature a 40mm focusing range and are graduated to 2 microns per division. Fitted with tension adjustment and safety up-stop.

Condenser. Brightfield models come with a 1.25 N.A. Abbe condenser. Phase contrast models come with a 1.25 N.A. Zernike condenser with phase annulus rings for 10X, 25X, 40X, and 100X; also has a “0” setting for brightfield work. All condensers are mounted on a rack and pinion focusing mechanism and feature spring-loaded centering knobs and iris diaphragm with a swing-in filter holder.

Illumination. 20W variable halogen light source. Comes with blue, green (phase contrast only) and neutral density filters. 0.5A 250V fuse.

Base. Stable 180 x 210mm fitted with anti-skid rubber feet.

Body. Cast metal, ergonomic body with stain-resistant enamel finish.

Table of Contents

5 YEAR WARRANTY

Warranty information and a registration card can be found at: www.veegee.com/pages/technical-support-service

Parts & Accessories

Included Parts

All microscopes listed below are shipped with a dust cover (1 ea.), instruction manual (1 ea.), warranty card (1 ea.), spare halogen bulb (1 ea.), and a spare fuse (1 ea.).

Model 1210CM

Monocular Head (1 ea.)
Stand (1 ea.)
Brightfield Condenser (1 ea.)
10X Eyepiece (1 ea.)
4X Achromatic Objective (1 ea.)
10X Achromatic Objective (1 ea.)
40X Achromatic Objective (1 ea.)
100X Achromatic Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)

Model 1211CM

Monocular Head (1 ea.)
Stand (1 ea.)
Brightfield Condenser (1 ea.)
10X Eyepiece (1 ea.)
4X Plan Objective (1 ea.)
10X Plan Objective (1 ea.)
40X Plan Objective (1 ea.)
100X Plan Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)

Model 1220CM

Binocular Head (1 ea.)
Stand (1 ea.)
Brightfield Condenser (1 ea.)
10X Eyepiece (2 ea.)
4X Achromatic Objective (1 ea.)
10X Achromatic Objective (1 ea.)
40X Achromatic Objective (1 ea.)
100X Achromatic Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)

Model 1221CM

Binocular Head (1 ea.)
Stand (1 ea.)
Brightfield Condenser (1 ea.)
10X Eyepiece (2 ea.)
4X Plan Objective (1 ea.)
10X Plan Objective (1 ea.)
40X Plan Objective (1 ea.)
100X Plan Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)

Model 1222CM

Binocular Head (1 ea.)
Stand (1 ea.)
Phase Contrast Condenser Assembly (1 ea.)
Phase Contrast Centering Telescope (1 ea.)
10X Eyepiece (2 ea.)
10X Achromatic Phase Objective (1 ea.)
20X Achromatic Phase Objective (1 ea.)
40X Achromatic Phase Objective (1 ea.)
100X Achromatic Phase Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)
Green Filter (1 ea.)

Model 1223CM

Binocular Head (1 ea.)
Stand (1 ea.)
Phase Contrast Condenser Assembly (1 ea.)
Phase Contrast Centering Telescope (1 ea.)
10X Eyepiece (2 ea.)
10X Plan Phase Objective (1 ea.)
20X Plan Phase Objective (1 ea.)
40X Plan Phase Objective (1 ea.)
100X Plan Phase Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)
Green Filter (1 ea.)

Model 1230CM

Trinocular Head (1 ea.)
Stand (1 ea.)
Brightfield Condenser (1 ea.)
10X Eyepiece (2 ea.)
4X Achromatic Objective (1 ea.)
10X Achromatic Objective (1 ea.)
40X Achromatic Objective (1 ea.)
100X Achromatic Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)

Model 1231CM

Trinocular Head (1 ea.)
Stand (1 ea.)
Brightfield Condenser (1 ea.)
10X Eyepiece (2 ea.)
4X Plan Objective (1 ea.)
10X Plan Objective (1 ea.)
40X Plan Objective (1 ea.)
100X Plan Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)

Model 1232CM

Trinocular Head (1 ea.)
Stand (1 ea.)
Phase Contrast Condenser Assembly (1 ea.)
Phase Contrast Centering Telescope (1 ea.)
10X Eyepiece (2 ea.)
10X Achromatic Phase Objective (1 ea.)
20X Achromatic Phase Objective (1 ea.)
40X Achromatic Phase Objective (1 ea.)
100X Achromatic Phase Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)
Green Filter (1 ea.)

Model 1233CM

Trinocular Head (1 ea.)
Stand (1 ea.)
Phase Contrast Condenser Assembly (1 ea.)
Phase Contrast Centering Telescope (1 ea.)
10X Eyepiece (2 ea.)
10X Plan Phase Objective (1 ea.)
20X Plan Phase Objective (1 ea.)
40X Plan Phase Objective (1 ea.)
100X Plan Phase Objective (1 ea.)
Dispersion Filter (1 ea.)
Blue Filter (1 ea.)
Green Filter (1 ea.)

Parts & Accessories

Optional Accessories:

Digital Camera Systems:

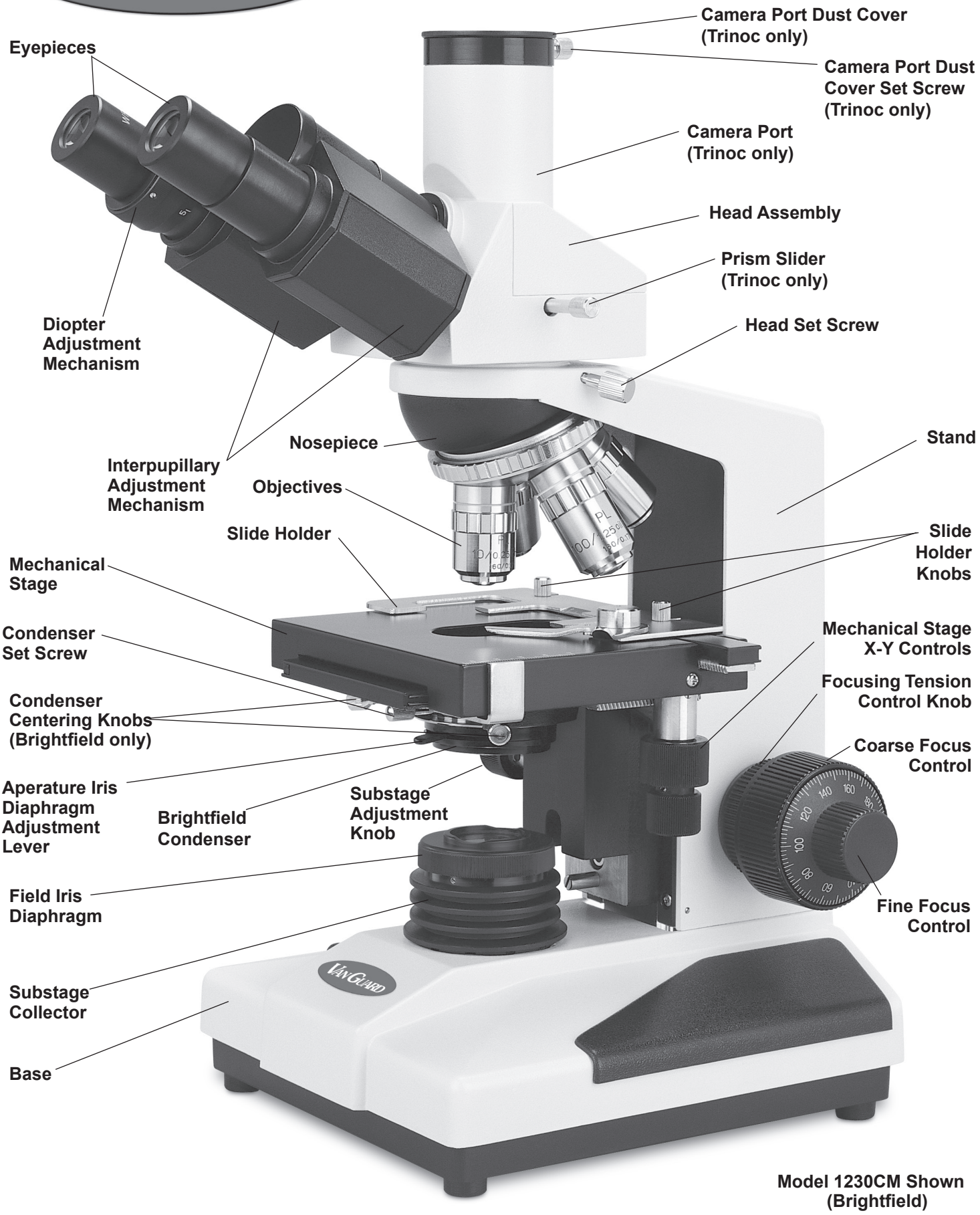
Part Number:	Description:
1400-CDPC-10:	USB Digital Camera System, 10 Megapixels - for 1210- and 1220-series
1200-CDPC-10:	USB DIgital Camera System, 10 Megapixels - for 1230-series
1400-CDPC-5:	USB Digital Camera System, 5 Megapixels - for 1210- and 1220-series
1200-CDPC-5:	USB DIgital Camera System, 5 Megapixels - for 1230-series
1400-CDPC-3:	USB Digital Camera System, 3 Megapixels - for 1210- and 1220-series
1200-CDPC-3:	USB DIgital Camera System, 3 Megapixels - for 1230-series

Other Accessories:

Part Number:	Description:		
Call for Part Numbers	Eyepieces:	10X, 16X, 20X	
Call for Part Numbers	Objectives:	Achromatic:	4X, 10X, 20X, 40X, 100X(oil)
		Plan Achromatic:	4X, 10X, 20X, 40X, 100X(oil)
		Achromatic Phase:	10X, 20X, 40X, 100X(oil)
		Plan Achromatic Phase:	10X, 20X, 40X, 100X(oil)
1200-IOG	Immersion Oil, Low Viscosity (1/4 oz. Bottle)		

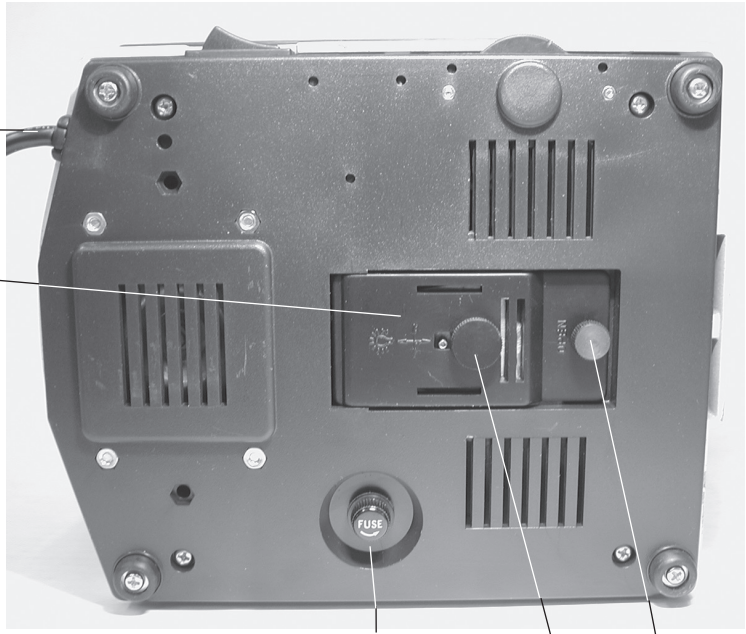
For information about parts, accessories, or service -- contact your dealer directly or contact VanGuard Microscopes at 1-800-423-8842.

Parts & Accessories



Model 1230CM Shown (Brightfield)

Parts & Accessories



Power Cord

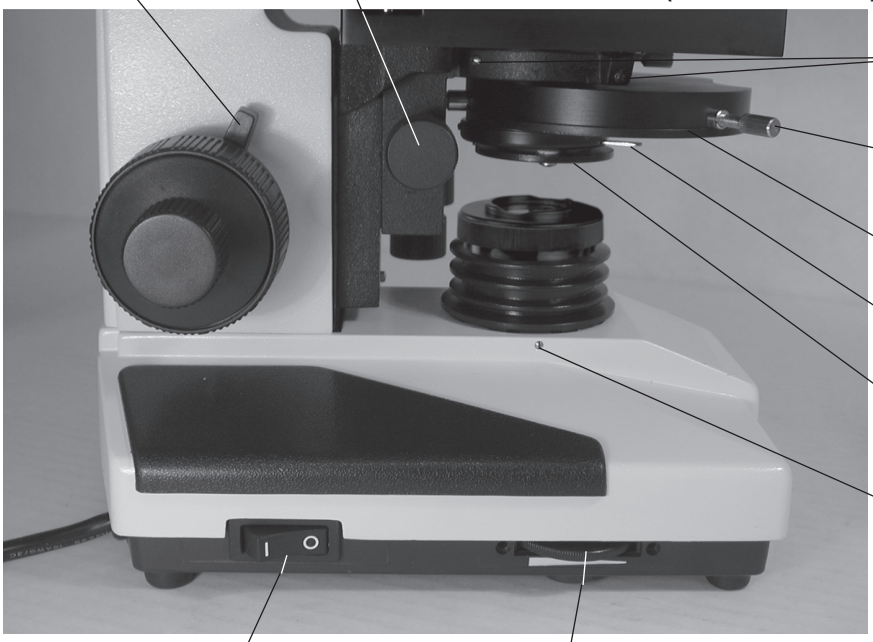
Light Bulb Access Door

Fuse Holder

Light Bulb Access Door Lock Knob

Light Bulb Centering Mechanism

Model 1233CM Shown (Phase-Contrast)



Up-Stop Control

Substage Adjustment Knob

Phase Condenser Centering Set Screws (2 shown only)

Phase Annuli Centering Knobs

Phase Contrast Condenser

Iris Diaphragm Adjustment

Swing-out Filter Holder

Substage Collector Set Screw

Power Switch

Variable Lighting Control

Setup

Assembly

All Models

The next three pages are dedicated to assembling a working microscope. The following section “Using your 1200CM Series Microscope” (starting on page 10) explains the various features of the microscope and how to use them.

1. After removing the microscope parts from the protective foam and plastic packaging and checking it over for all components and accessories (see list on page 3), you can begin assembly.
2. Place the stand on a stable counter top.

   NOTE: Do not release the head until it is firmly secured with the head set screw.
3. Loosen the head set screw (circled in figure 1) and rotate the head 180° so the eyepieces face forward.
4. Retighten the head set screw.

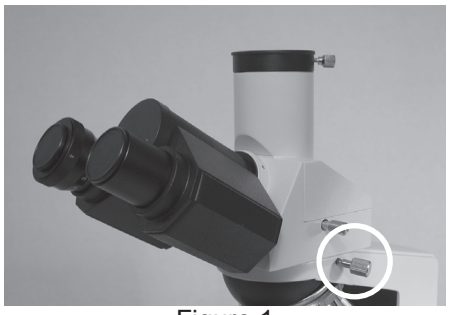


Figure 1

5. Remove the dust caps from the eyetubes, then insert the eyepieces into the eyetubes (see figure 2).

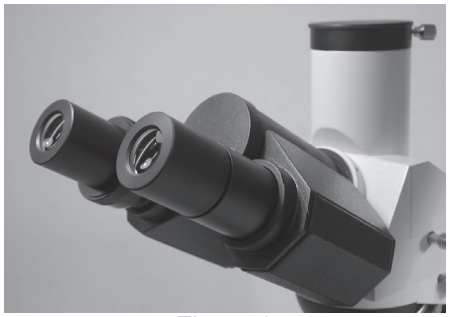


Figure 2

6. After removing the objectives from their storage containers, individually install each one into the nosepiece by threading them clockwise into the threaded holes of the nosepiece (see figure 3). It is generally considered best practice to install the objectives in numerical order.

The next four steps describe how to install the condenser. With phase-contrast models the condenser comes pre-installed. If this is the case, assembly is complete. Skip ahead to “Centering the Condenser” on page 8 unless you need to reattach your condenser for any reason.

Note: The phase contrast condenser is pictured, but the assembly instructions are identical for the brightfield condenser.

Figure 3

7. Raise the substage and stage to their maximum height (see figure 4). Raise the stage via the coarse focus control and the substage using the substage adjustment knob.
8. Loosen the condenser set screw enough to allow the neck of the condenser to slide through the silver ring.

Figure 4

Assembly (cont.)

All Models

9. Gently slide the condenser up through the silver ring of the condenser mount until it will go no further (see figure 5). Make sure that the condenser is oriented as shown in figure 5. If the condenser will not slide freely through the silver ring (and you've checked that the condenser set screw is backed out far enough), do not force, simply wiggle the condenser while lightly pushing up.
10. Once the condenser assembly is in place, lower the substage via the substage adjustment knob and tighten the condenser set screw just enough to prevent the condenser from spinning or sliding out.

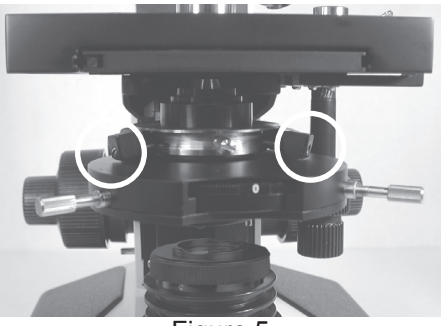


Figure 5

Substage Adjustments

1. **Centering**: The condenser must be centered in the light path to ensure proper light control. A simple method for centering is as follows:
   - Rotate the nosepiece until the 10X objective is in the light path.
   - Raise the substage assembly fully by turning the substage adjustment knob counter-clockwise.
   - Open the aperature iris diaphragm to the largest setting by using the aperature iris diaphragm adjustment lever which extends from the condenser assembly.
   - While looking into the microscope eyepieces, close the field iris diaphragm to the smallest setting by turning the uppermost section of the substage illuminator counter-clockwise.
   - Closing the iris in this manner will reduce the field so that a small white hexagon is visible within a black field (see Figure 6A). Focusing of the hexagon is performed by turning the coarse/fine focus controls. This white hexagon is the light which is passing through the field iris and should be centered in the black field. If not, move it to the center (see Figure 6B) by tightening and/or loosening the condenser centering knobs.

   ***Note**: On phase contrast models condenser centering is done with set screws (screwdriver not included) instead of knobs. Locations for two of the set screws are shown in the photo above (figure 5), and two more are on the rear of the condenser mount. It is easiest to back the set screws all the way out and tighten each one slightly while checking often that the condenser is still centered.*

   - Fine tuning can be done by opening the field iris diaphragm until the white hexagon almost fills the entire field (see Figure 6C), and then readjusting (see Figure 6D). After centering the condenser open the field iris diaphragm slightly wider than the field of view.

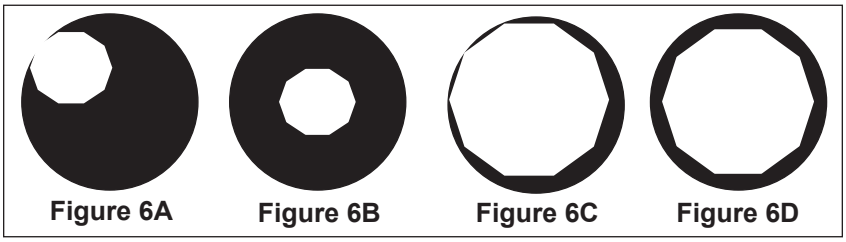


Figure 6A **Figure 6B** **Figure 6C** **Figure 6D**

2. **Vertical Focusing**: The condenser can be raised and lowered with the substage adjustment knob to focus the light for optimal illumination.
3. **Aperture Adjustment**: The light path can be adjusted with the aperature iris diaphragm adjustment lever located just below the condenser. Aperture adjustments are made to induce contrast into a specimen, not to adjust light intensity.

Centering the Illuminator

All Models

Verifying that the illuminator is centered will allow maximum light to reach the specimen. This adjustment is usually not required as our microscopes are shipped with the illuminator pre-centered. If for some reason the illuminator should need to be centered again follow the instructions below.

1. Remove the substage collector by loosening the set screw on the left hand side.
2. The bulb filament should be centered in the opening. If it is not, loosen the bulb centering mechanism on the bottom of the microscope.
3. Reposition the bulb so that the filament is at the center of the opening. Make sure that the reflector beneath the bulb is aligned with the light bulb access door so that the access door can still be opened.
4. Tighten the bulb centering mechanism.
5. Reinstall the substage collector.

If you purchased a brightfield model this completes your setup. Skip ahead to page 10, "Using your 1200CM Series Microscope". If you purchased a phase contrast model, continue below.

Aligning the Phase Contrast Annulus Rings

Phase Contrast Models

Once the phase contrast condenser assembly has been centered, the phase contrast annulus rings must be centered for the objectives. Phase contrast is a system which involves a series of light baffling annular rings. Proper alignment of these rings is absolutely necessary to achieve phase contrast.

Figure 7

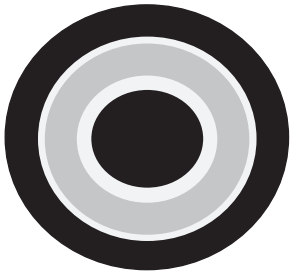


Figure 8

1. Begin by turning on the substage illuminator with the power switch.
2. Set the objectives so they are in the approximate position for actual use. This is best achieved by placing a slide on the stage, rotating the 100X objective into position, and raising the stage until the tip of the 100X objective is just above the slide (almost touching).
3. Rotate the nosepiece until the 10X objective is in the light path.
4. Rotate the annuli turret in the phase contrast condenser assembly until the "10" is seen in the viewing window.
5. Remove an eyepiece from one of the eyetubes and replace with the phase contrast centering telescope.
6. Looking through the phase contrast centering telescope, turn the uppermost piece of the phase contrast centering telescope until the image is in focus.
7. The image seen through the phase contrast centering telescope should resemble rings superimposed on one another (see Figure 7). What is actually being viewed are the phase rings. Holding a white sheet of paper on the stage and sliding back and forth between the objective and stage will make this easier to see.
8. Turn the phase annuli centering knobs, which extend from the phase contrast condenser assembly, until the two rings of light are centered upon one another (see Figure 8).
9. Once the phase rings are centered, remove the phase contrast centering telescope and replace with the eyepiece.
10. The phase rings are now centered for the other remaining objectives. This process shouldn't need to be repeated for each objective setting, although it is advised to perform off and on checks with the phase contrast centering telescope to confirm that the phase rings are still centered.

    NOTE: Brightfield work can be achieved on models with a phase contrast condenser. The "0" setting on the phase annulus turret is used for this purpose.

Variable Lighting Control/Power Switch

All Models

VanGuard 1200CM Microscopes are equipped with a rheostat controlled variable lighting control, which allows the user to set the lighting anywhere between off and full brightness. The variable lighting control is located on the left side of the microscope in front of the power switch. To increase the brightness roll the wheel towards the rear of the microscope.

The rocker switch located on the left hand side of the microscope (see page 6) turns the power on or off. To turn the power on press the rocker on the end marked "|". To turn the power off press the rocker on the end marked "O".

Focusing and Mechanical Stage Mechanisms

All Models

1. Focusing adjustment is achieved by turning the coarse/fine focus controls (see figures 9 and 10). The large knob is used for coarse adjustment, the smaller knob for fine adjustment. The coaxial arrangement allows for easy, precise adjustment without stage drift.
2. Turning the coarse/fine focus control raises and lowers the stage vertically. One complete turn of the fine focusing knob raises or lowers the stage 0.3mm; the smallest graduation refers to 2 microns of vertical movement. One complete turn of the coarse focusing knob raises or lowers the stage 3.6mm. To ensure long life, turn the focusing knobs slowly and uniformly.
3. The focusing tension control knob is located just inside of the right-hand focus control knob (see figure 9). For tighter tension, turn the control knob in a clockwise motion. For looser tension, turn the control knob in a counterclockwise motion.
4. Vertical Focusing: The condenser can be raised and lowered with the substage adjustment knob to focus the light for optimal illumination.
5. Aperture Adjustment: The light path can be adjusted with the iris diaphragm adjustment lever located underneath the condenser. Aperture adjustments are made to induce contrast into a specimen, not to adjust light intensity.
6. The mechanical stage X-Y controls, located underneath the right-hand side of the stage (see figure 9), provide easy and accurate positioning of the sample. One complete turn of the longitudinal (Y) control (lower half of the stage controls) will move the specimen 34mm left or right. One complete turn of the transverse (X) control (upper half of the stage controls) will move the specimen 20mm front or back.
7. The spring-loaded slide holder can be removed for users who prefer to not use a mechanical stage. Simply loosen the knurled slide holder knobs which lock the slide holder on the stage, and slip out the slide holder.

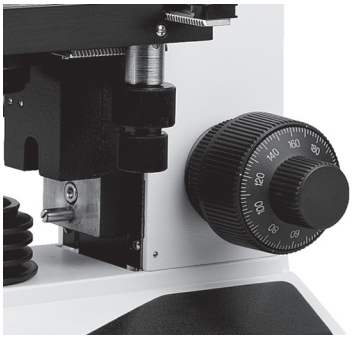


Figure 9

Figure 10

Interpupillary and Diopter Adjustment

All Models

1. Interpupillary adjustment (the distance between eyepieces) is made through a “folding” action. The Seidentopf design allows for a folding adjustment which is quickly and easily done for each user (see figure 11).
2. Diopter adjustment allows for proper optical correction based on each individual’s eyesight. This adjustment is easily made and is recommended prior to each use by different users to prevent eyestrain.
3. Using the 40X objective and a sample slide (i.e. one which produces an easily focused image), close your left eye and bring the image into focus in your right eye with the coarse/fine focus control.
4. Once the image is well-focused using only your right eye, close your right eye and check the focus with your left.
5. If the image is not perfectly focused, make fine adjustments with the diopter adjustment mechanism located on the left eyetube (see figure 12).
6. Once complete, the microscope is corrected for your vision.

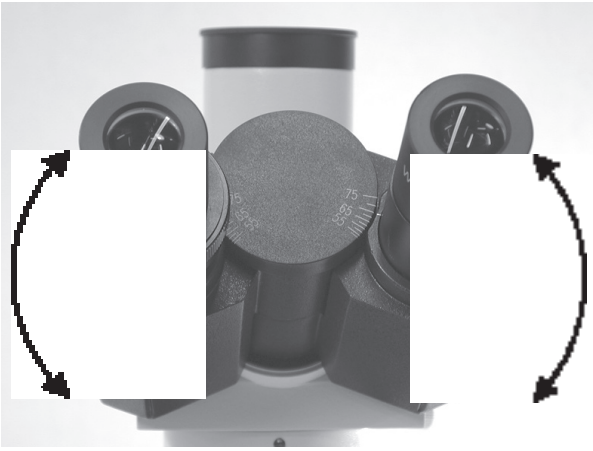


Figure 11

Figure 12

Setting the Up-Stop Mechanism

All Models

The up-stop mechanism is located just inside of the left-hand focus control knob (see figure 10). It allows the user to set a maximum point to which the stage can be raised, which prevents damage to the specimen and objective.

1. To set this point, turn the up-stop mechanism in a counterclockwise motion, so that its tab is facing down (which is also the “no up-stop position” for normal use).
2. Raise or lower the stage, by turning the focus control knobs, to the desired height. Be careful not to raise the stage high enough to crash into the objective.
3. Once achieved, turn the up-stop mechanism in a clockwise motion, so that its tab is facing up (see figure 10).
4. Once gently tightened, the up-stop mechanism will not allow the stage to be raised higher than the set point.

Using the Camera Port

Trinocular Models Only

1. Assemble the adapters and connect to the camera using the instructions provided with the camera/adapter kit.

   Note: Camera kit is not included with this microscope. Please see page 3 for available camera kits.
2. Loosen the camera port set screw (circled in figure 13), and remove the camera port dust cap.
3. Place the adapter/camera assembly on top of the camera port and slide the dovetail flange into place.

   Note: Do not release the camera/adapter assembly until it is firmly secured with the camera port set screw.
4. Tighten the camera port set screw.
5. Pull the prism slider completely out to divert the image to the camera port. The prism slider is the silver knob on the right side of the head assembly (circled in figure 14).

   Note: The 1200 Series Microscopes utilize a 100/100 sliding prism. This prism diverts 100% of the light to the camera port while the prism slider is pulled out. For this reason the eyepieces can not be used while the prism slider is pulled out.
6. When the camera port is not in use, be sure to cover with the camera port dust cap.

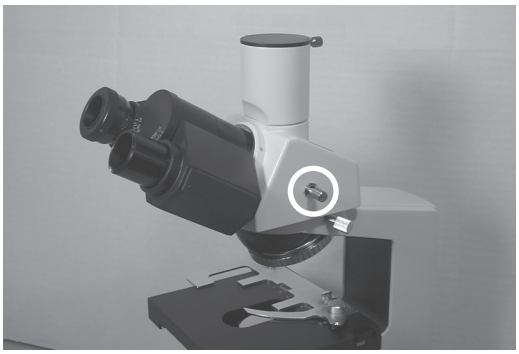


Figure 13

Figure 14

Oil Immersion Objectives

All Models

The 100X objective which comes with this microscope must be used with immersion oil in order to maintain image quality. After use, the objective tip needs to be wiped clean so that no oil residue remains.

Procedure for using immersion oil:

1. Place one drop of immersion oil on the prepared slide.
2. Slowly lower the 100X objective until it makes contact with the drop of immersion oil. You should now be able to focus on the specimen.

Procedure for cleaning the 100X Oil Immersion Objective:

1. Lightly moisten a cotton swab with lens cleaner.
2. Wipe the objective with a twisting motion in order to remove all traces of the immersion oil.
3. Check that all immersion oil has been removed before storing the objective.

Note: Under no circumstances should an oil immersion objective be left sitting in oil for an extended period of time. Exceptionally long immersion periods can cause oil to penetrate the objective's sealant and obscure the optics, which is not covered under warranty.

Note: You should avoid getting oil on any objective other than the 100X, as they are not sealed. Pay particular attention to the 40X, given its resemblance to the 100X objective.

Using Filters

All Models

Your Vanguard Microscope was supplied with two or three filters. Brightfield models come with a neutral density (frosted) filter and a blue filter. Phase contrast models add a green filter.

Procedure for Using Filters:

1. Locate the swing-out filter holder located on the bottom of the condenser.
2. Using the tab, swing the filter holder out of the light path.
3. Insert the desired filter into the filter holder.
4. Swing the filter and filter holder back into the light path.

Neutral density filters can be used to soften harsh illumination for both viewing and photomicroscopy. Neutral density filters can control photograph exposure levels.

The **green filter** is used mainly for added contrast and photograph color correction during phase contrast work.

The **blue filter** is used to approximate natural light and photograph color correction.

Filtering is a user preference and application specific issue and therefore is beyond the scope of this manual. There are many sources available that explain proper filtering technique and theory.

Maintenance

Replacing the Light Bulb

All Models

1. Before attempting to replace or remove the light bulb, UNPLUG THE MICROSCOPE FROM ANY POWER SOURCE AND ALLOW THE BULB TO COOL COMPLETELY.
2. Carefully lay the microscope on its side to locate the light bulb access door on the bottom of the microscope (see Figure 15).
3. To open the door, unscrew the knob (circled in figure 15) and pull outward.
4. Once the door is open, the bulb can be removed by grasping the bulb and pulling it from its socket.

   Note: Be careful not to touch the glass bulb when replacing -- use a tissue or other medium to grasp the bulb. This will prevent the oils from your hand from reducing lamp life. If contact is made with the bulb, clean with rubbing alcohol and allow a brief drying period.
5. When replacing, insert the new bulb into the same socket. Make sure that the pins on the bulb slide easily into the socket. You should not have to force the bulb.
6. Close the light bulb access door and screw the knob back in to lock.
7. Return the microscope to normal operating position.
8. If necessary recenter the illuminator following the instructions on page 9.

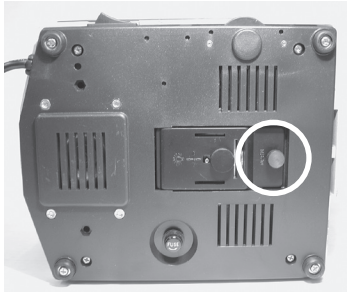


Figure 15

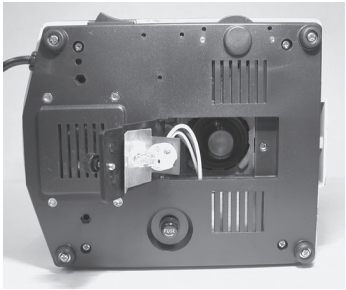


Figure 16

Replacing the Fuse

All Models

1. If the microscope is plugged in but the lamp is not turning on, the fuse could be blown. To check the fuses, UNPLUG THE MICROSCOPE FROM ANY POWER SOURCE.
2. Carefully lay the microscope on its side and locate the fuse holder (circled in figure 17).
3. Unscrew the fuse holder from the base.
4. Remove the fuse from the fuse holder by pulling on the fuse.
5. If the fuse is blown (the wire inside is broken, or the glass is blackened) insert a new fuse (see below for replacement fuse information) into the fuse holder.
6. Screw the fuse holder back into the base.
7. Return microscope to normal operating position.

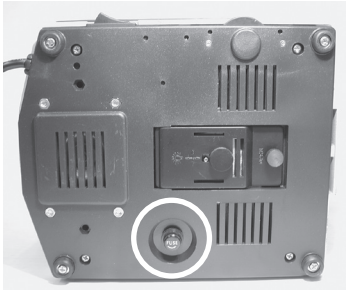


Figure 17

Replacement Lamp -- 20W Halogen (Cat. No. 1400-20WHL)
Replacement Fuse -- 0.5A, 250V (Cat. No. 1200-FS1)

For information about parts, accessories, or service -- contact your dealer directly or contact VanGuard Microscopes at 1-800-423-8842.

Maintenance

Caring for your 1200CM Microscope

All Models

1. The eyepieces and objectives on VanGuard Microscopes are coated. They should never be wiped while dry as any dirt or dust will scratch the coating. The surfaces should either be blown off with an air canister, or blown and cleaned with an air-bulb and camel-hair brush. It is recommended to then use a lens cleaner. **Never use anything other than lens cleaner on any optical component.** Apply with a cotton swab for a minimum of wetting, then wipe the surface clean with a quality lens tissue.
2. The same care instructions apply to all optical parts on this VanGuard Microscope, including the substage collector and the condenser lenses.
3. All other parts can be cleaned with a paper towel and rubbing alcohol. Be aware that rubbing alcohol can break down lubricants, so be careful when cleaning near the following parts:

    - Stage rack and pinion gears
    - Focus controls
    - Nosepiece
    - Substage gears
    - Substage controls

4. Xylene, since it breaks down the bonding material holding the lenses, should never be used as a cleaner.
5. Periodically your VanGuard Microscope should be fully serviced by a qualified service technician.
6. In order to keep dust and debris out of the optical pathways, always keep the camera port and eyetubes covered (with either eyepieces or dust caps), and always use the dust cover when the microscope is not in use.

For information about parts, accessories, or service -- contact your dealer directly or contact VanGuard Microscopes at 1-800-423-8842.

Troubleshooting

This chart may help resolve some of the more common problems associated with using a compound microscope. Simply follow the steps until your problem is resolved. As always, you can contact your dealer or VanGuard Microscopes if you ever need help.

I can't get any light

Step #	Possible Cause	How to Check	Result	Solution	For More Info
1	Light not switched on	Visually inspect	Switched on	Go to next step	
			Not switched on	Move power switch to "|" position	Page 10
2	Not plugged in	Visually inspect	Plugged in	Go to next step	
			Not plugged in	Plug in	
6	Variable lighting control (VLC) turned all the way down	Visually inspect	VLC turned up	Go to next step	
			VLC turned down	Turn VLC up	Page 10
3	Not getting power	Plug in another electrical appliance	Getting power	Go to next step	
			Not getting power	Switch to different outlet	
4	Bad fuse	Visually inspect (see page 13)	Good fuse	Go to next step	
			Bad fuse	Install new fuse	Page 14
5	Bad bulb	Try different bulb	Good bulb	Contact dealer or VanGuard Microscopes	Page 17
			Bad bulb	Install new bulb	Page 14

I can't get enough light

Step #	Possible Cause	How to Check	Result	Solution	For More Info
1	Variable lighting control (VLC) is turned down too far	Visually inspect	VLC turned up	Go to next step	
			VLC turned down	Turn VLC up	Page 10
2	Bulb not centered	Visually inspect (page10)	Bulb centered	Go to next step	
			Bulb not centered	Center the bulb	Page 9
3	Condenser not centered	Recenter the condenser (page 8)	Centered	Go to next step	
			Not Centered	Center the condenser	Page 8
4	Condenser height not adjusted properly	Visually inspect	Adjusted properly	Go to next step	
			Not adjusted properly	Adjust condenser height	Page 10
5	Dirty condenser and/or substage illuminator	Visually inspect	Dirty	Clean condenser and/or substage illuminator with lens cleaner and lens cloth	Page 15
			Not dirty	Consider purchasing auxiliary lighting or Kohler Illumination kit. Contact dealer or VanGuard Microscopes	Page 17

I can't raise the stage

Step #	Possible Cause	How to Check	Result	Solution	For More Info
1	Up-Stop Mechanism is set too low	Visually inspect	Set incorrectly	Set to "no up-stop"	Page 11
			Set correctly	Go to next step	
2	Stage is at maximum height	Visually inspect	At max height	Can't be raised any further	
			Not at max height	Contact dealer or VanGuard Microscopes	Page 17

Troubleshooting

I can't see anything through the eyepieces/camera

Step #	Possible Cause	How to Check	Result	Solution	For More Info
1	Light not turned on	Visually inspect	Turned on	Go to next step	
			Not turned on	Turn on light	Page 10
2	VLC set too low	Visually inspect	Not set too low	Go to next step	
			Set too low	Increase VLC	Page 10
3	Objectives not installed	Visually inspect	Installed	Go to next step	
			Not installed	Install objectives	Page 7
4	Condenser not installed	Visually inspect	Condenser installed	Go to next step	
			Condenser not installed	Install condenser	Page 7
5	Prism slider pulled out/pushed in (trinocular models only)	Visually inspect	Prism slider in correct position	Go to next step	
			Prism slider not in correct position	Pull out for camera/push in for eyepieces	Page 12
6	Something blocking light path between substage illuminator and objectives	Visually inspect	Blockage	Remove blockage	
			No blockage	Contact dealer or VanGuard Microscopes	Page 17

I can't focus on the specimen

Step #	Possible Cause	How to Check	Result	Solution	For More Info
1	Up-stop set too low	Visually inspect	Set too low	Reset up-stop to appropriate height	Page 11
			Not set too low	Go to next step	
2	Using the 100X objective without immersion oil	Visually inspect	Using oil	Go to next step	
			Not using oil	Use immersion oil	Page 13
3	Condenser not installed	Visually inspect	Condenser installed	Go to next step	
			Condenser not installed	Install condenser	Page 7
4	Oil in objective/dirty objectives	Visually inspect	Objectives clean	Go to next step	
			Objectives dirty	Clean or replace objectives	Page 15
5	Slide placed on stage upside down	Visually inspect	Slide upside down	Flip slide	
			Slide not upside down	Go to next step	
6	Cover glass too thick	Visually inspect	Cover glass too thick	Use #1.5 (0.17mm) cover glass	
			Cover glass not too thick	Contact dealer or VanGuard Microscopes	Page 17

The stage keeps drifting down

Step #	Possible Cause	How to Check	Result	Solution	For More Info
1	Focus tension is set too low	Check focus tension control knob (page 10)	Not enough tension	Increase tension	Page 10
			Plenty of tension	Contact dealer or VanGuard Microscopes	Page 17

For information about parts, accessories, or service -- contact your dealer directly or contact VanGuard Microscopes at 1-800-423-8842.

VAN GUARD® Specifications

Viewing Head:	Trinocular/Binocular/Monocular	
Viewing Head Type:	Seidentopf [Trinocular/Binocular Models]	
Head Rotation:	360°	
Head Inclination:	30°	
Sliding Prism:	100/100 Split [Trinocular Models]	
Interpupillary Adjustment:	55-75mm	
Dioptric Adjustment:	-5 to +5	
Eyepiece Magnification:	10X Widefield	
Eyepiece Field Diameter:	18mm	
Optional Eyepieces:	16X [Field Diameter: 11mm]	
	20X [Field Diameter: 11mm]	
Nosepiece:	Quadruple Position/Reversed	
Brightfield Objectives:	4X	[0.10 NA, 17.0mm WD, 4.5mm FOV]
[Achromatic or Plan Achromatic]	10X	[0.25 NA, 8.0mm WD, 1.8mm FOV]
	40X	[0.65 NA, 0.40mm WD, 0.45mm FOV]
	60X	[0.85 NA, 0.30mm WD, 0.3mm FOV]
	100X(oil)	[1.25 NA, 0.25mm WD, 0.18mm FOV]
Phase Contrast Objectives:	10X	[0.25 NA, 8.0mm WD, 1.8mm FOV]
[Achromatic or Plan Achromatic]	20X	[0.40 NA, 0.50mm WD, 0.9mm FOV]
	40X	[0.65 NA, 0.40mm WD, 0.45mm FOV]
	100X(oil)	[1.25 NA, 0.25mm WD, 0.18mm FOV]
Stage Dimensions:	125mm x 135mm	
Stage Motion:	Right-Hand Coaxial Control/Rack & Pinion Drive	
Stage Movement Range:	30 x 70mm	
Focusing Movement:	Coaxial Coarse & Fine Controls/Safety Up-Stop	
Focusing Range:	40mm	
Focusing Graduation:	2 Microns/Division	
Brightfield Condenser:	1.25 NA Abbe Condenser with Iris Diaphragm	
Phase Contrast Condenser:	1.25 NA Zernike Condenser with Iris Diaphragm	
Phase Centering Tool:	Telescoping Eyepiece [Included with Phase Contrast Models]	
Lower Illumination:	20W/6V Variable Quartz Halogen	
Fuse:	0.5A, 250V	
Voltage:	110V	
Base Dimensions:	180mm x 210mm	
Overall Dimensions:	210mm (L) x 180mm (W) x 380mm (H) [Binocular/Monocular Models]	
Weight:	10.7kg [Binocular Models]	

NA = Numerical Aperture
WD = Working Distance
FOV = Field of View

Notes

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