VAN GUARD®

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VGMNL062512-1400MMi

VAN GUARD®

Microscopes

Operation Manual

Model 1442MMi

Introduction

1442MMi Industrial Microscope

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. Before using this microscope it must be properly setup, which requires some familiarity with the microscope. For this reason we recommend you read this entire manual carefully before setting up and using the instrument.

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5 YEAR WARRANTY

See included warranty card for more information.

Vanguard 1442MMi Industrial microscopes are suited for brightfield and simple polarization observation of industrial applications such as semiconductor inspection, viewing of metallographic specimens, and crystallographic analysis.

Viewing Head. Trinocular (Seidentopf) head is inclined at 30° and features interpupillary and dioptric adjustments. The trinocular head features a sliding main prism with a 100/0 split.

Eyepieces. 10X ultra-widefield with a field number of 22.

Nosepiece. Quintuple, ball-bearing nosepiece with high-grade lubricant for smooth operation, and positive stops.

Objectives. The Plan Achromatic, long working distance, infinity corrected objectives are optically coated to reduce unwanted reflections.

Stage. The mechanical stage measures 140mm x 185mm and includes a removable 95mm x 75mm glass insert. Motion of mechanical stage is controlled by a right-hand, low-position coaxial control and is driven by a rack and pinion system.

Focusing movement. Coaxial, ultra-low position coarse and fine focus controls feature a 30mm focusing range and are graduated to 2 microns per division. Fitted with a tension adjustment and stage limit control.

Transmitted Condenser. The 0.85 N.A. Abbe brightfield condenser includes an iris diaphragm and swing-in lens.

Transmitted Illumination. 30W variable quartz halogen light source. Comes with blue and dispersion filters. Also includes filters for simple polarization.

Reflected Illumination. 50W variable quartz halogen light source. Comes with blue, yellow, green, and dispersion filters. Also includes filters for simple polarization.

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

VANGUARD Microscopes

5 Year Limited Warranty

VanGuard Microscopes are warranted by VEE GEE Scientific, Inc. to be free from defects in material and workmanship for a period of five (5) years from the date of purchase, except for electrical components which have a one (1) year limited warranty. During this period, VEE GEE Scientific, or its authorized service station, will at their option and without charge, either repair or replace any part found to be defective in materials or workmanship.

This warranty is subject to the following limitations and exceptions and will not apply if:

1) There is lack of proof of date and place of purchase. The purchase invoice must accompany the unit when sent in for repair. The warranty extends to the original consumer purchaser only and is not assignable or transferable.

2) The damage is due to normal wear and tear, misuse, abuse, negligence, accident, inadequate maintenance, disregard for operating instructions, or to any other cause not due to the manufacture of the microscope (i.e. objective failure because of oil penetration due to lack of timely cleaning).

3) The serial numbers, names, and/or functions are altered or obliterated; or unauthorized repair or replacement of parts by the End-User or an unauthorized third party while under warranty.

4) Consumable items (such as, but not limited to bulbs) have failed.

This warranty expressly excludes transportation damage and adjustment or readjustment. In no case shall VEE GEE Scientific be liable to the Buyer or any person for any special, indirect, incidental, or consequential damage whether claims are based in contract or otherwise with respect to or arising out of product furnished hereunder. For goods manufactured by any third party, VEE GEE Scientific's liability under warranty is limited to the terms of the warranty by the supplier for the goods. All warranty work shall be performed at the authorized service center which is: National Microscope Exchange, Tel: (425) 788-2662. Contact your distributor or NME to discuss the problem and obtain instructions for the return of your microscope for repair. The original purchaser returning this product must prepay all postage, shipping, transportation, packaging, and delivery costs to NME.

Specifications

Viewing Head:	Trinocular
Viewing Head Type:	Seidentopf
Head Inclination:	30°
Sliding Prism for Trinocular Port:	100/0 Split
Interpupillary Adjustment:	55-75mm
Dioptric Adjustment:	-5 to +5
Eyepiece Magnification:	10X High Eyepoint, Ultra-Widefield
Eyepiece Field Diameter:	22mm
Nosepiece:	Quintuple, reverse facing
Brightfield Objectives:	5X [0.12 N.A., 26mm W.D.]
(Plan Achromatic, Infinity, LWD)	10X [0.25 N.A., 20mm W.D.]
	20X [0.40 N.A., 9mm W.D.]
	40X [0.60 N.A., 4mm W.D.]
Stage Dimensions:	140mm x 210mm
Stage Motion:	Right-Hand Coaxial Control/Rack & Pinion Drive
Stage Movement Range:	752x 63mm
Focusing Movement:	Coaxial Coarse & Fine Controls
Focusing Graduation:	2 microns Per Division
Brightfield Condenser:	0.85 N.A. Abbe Condenser with Iris Diaphragm
Transmitted Illumination:	30W, 12V Variable Quartz Halogen
Reflected Illumination:	50W, 12V Variable Quartz Halogen
Fuse:	3A, 250V
Voltage:	110V [Standard], 220V [Optional]
Base Dimensions:	280mm x 250mm
Overall Dimensions:	470mm (L) x 250mm (W) x 520mm (H)
Weight:	10kg

General Information

Table of Contents

Safety Symbols

Anytime you see the following symbols used in this manual pay special attention and follow the safety precautions.

Attention - possible injury or product damage if instructions are not followed

Hot Surface - potential for burns if contact with hot surfaces are made

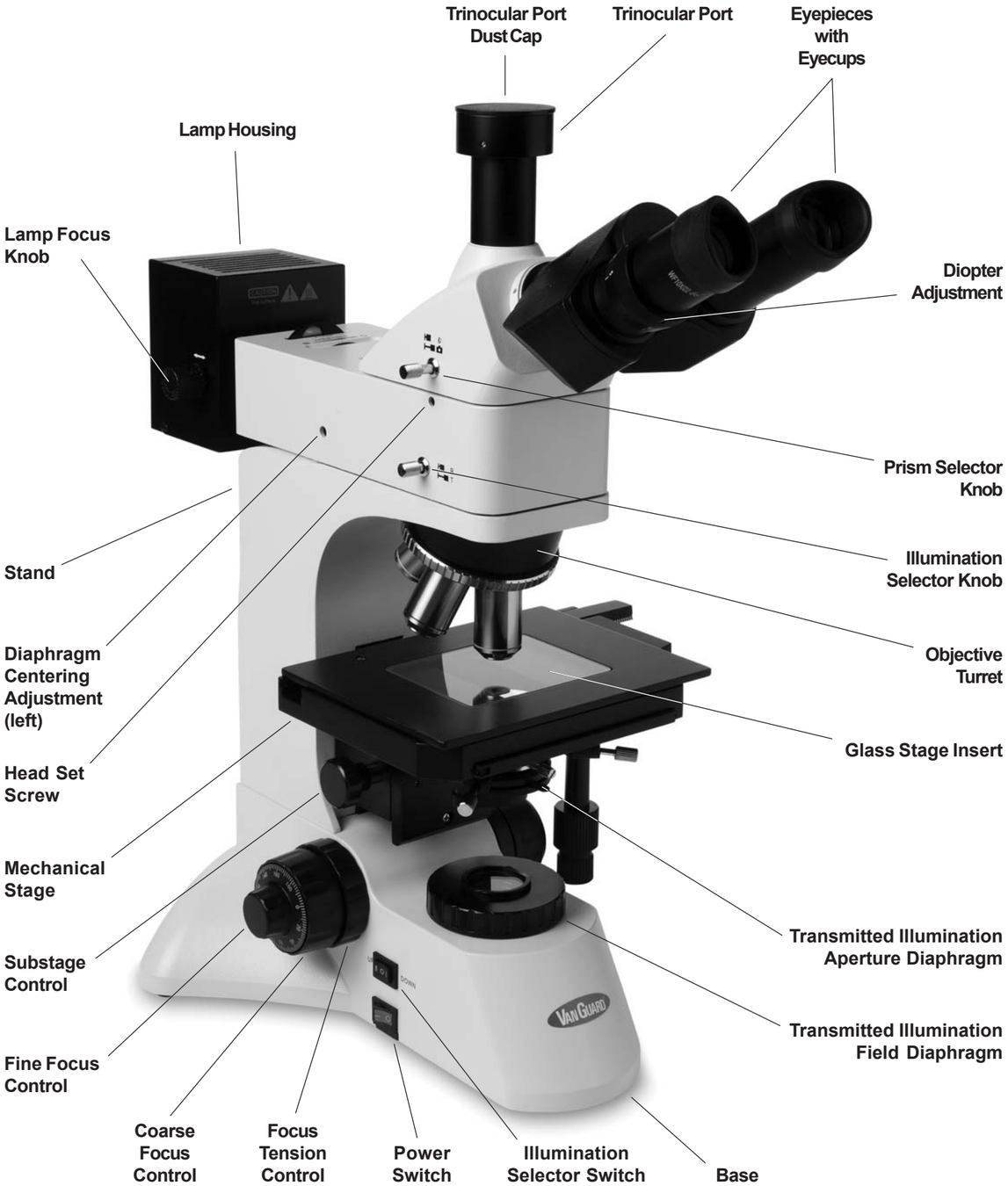
Shock Hazard - failure to follow instructions could lead to electrical shock

Safety Precautions

Before replacing the lamp or fuses always turn off the power switch and disconnect the power cord. Always use the correct type and rated fuses. Using incorrect fuses could result in damage to the microscope and electrical shock. Only use the supplied power cord and ensure that you are using a properly grounded outlet.

It is normal for the illuminator housing to get hot during use. Be careful to avoid touching the illuminator housing until the unit has had sufficient time to cool after switching off.

VanGuard® Components



VanGuard® Troubleshooting

Symptom: *No image visable in eyepiece and/or trinocular port*

Step #	Possible Cause	How To Test	Test Result?	Solution	For More Info
1	Light is not switched on	Visually inspect	Switched on	Go to next step	
			Not switched on	Move power switch to on position	Page 12, 16
2	Variable lighting control (VLC) is set too low	Visually inspect	Not set too low	Go to next step	
			Set too low	Increase VLC level	Page 12, 16
3	Objectives not installed or turret is set to empty position	Visually inspect	Objectives are installed	Go to next step	
			Objectives not installed	Install objectives or change turret position	Page 10
4	Prism selector knob in wrong position	Visually inspect	In correct position	Go to next step	
			Not in correct position	Set to correct position	Page 11
5	Illumination selector switch and/or knob are set at incorrect positions	Visually inspect	In correct position	Go to next step	
			Not in correct position	Set to correct position	Page 12, 16
6	Light path blocked (transmitted illumination)	Visually inspect space between illuminator and objectives	Nothing blocking	Contact dealer or VanGuard Microscopes	
			Blockage present	Remove blockage	Page 18

Symptom: *Image through eyepieces is too dim*

Step #	Possible Cause	How To Test	Test Result?	Solution	For More Info
1	Variable lighting control (VLC) is turned down too far	Visually inspect	VLC is turned up	Go to next step	
			VLC is turned down	Turn VLC up	Page 12, 16
2	Lamp not centered properly	Visually inspect	Lamp is centered	Go to next step	
			Lamp is not centered	Center the lamp	Page 13, 17
3	Dirty condenser, eyepiece, or objective lenses	Visually inspect	Lenses are clean	Contact dealer or VanGuard Microscopes	
			Lenses are dirty	Clean condenser, eyepiece, or objective lenses	Page 23

Symptom: *Can't focus on specimen image*

Step #	Possible Cause	How To Test	Test Result?	Solution	For More Info
1	Dirty objective	Visually inspect	Objective is clean	Go to next step	
			Objective is not clean	Clean objective or replace with new objective	Page 23
2	Stage limit set too low	Check position of stage limit by loosening the control and adjusting the focus	Stage limit set correctly	Contact dealer or VanGuard Microscopes	
			Set too low	Raise stage and set stage limit	Page 15

Symptom: *The stage keeps drifting downward*

Step #	Possible Cause	How To Test	Test Result?	Solution	For More Info
1	Focus tension is set too loose	Check focus tension control	Tension set correctly	Contact dealer or VanGuard Microscopes	
			Tension too loose	Increase tension	Page 15

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

VanGuard® 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.

Symptom: *No light visable from transmitted (lower) illuminator*

Step #	Possible Cause	How To Test	Test Result?	Solution	For More Info
1	Light is not switched on	Visually inspect	Switched on	Go to next step	
			Not switched on	Move power switch to on position	Page 16
2	Illumination selector switch is not set to the “Down” position	Visually inspect	Set to “Down”	Go to next step	
			Set to “Up”	Switch the selector to “Down”	Page 16
3	Main power cord and/or illuminator plug not connected	Visually inspect	Plugged in	Go to next step	
			Not plugged in	Plug in power cord or illuminator plug	Page 11
4	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 16
5	Microscope not getting power	Inspect outlet	Good outlet	Go to next step	
			Outlet not good	Plug power cord into working outlet	Page 11
6	Blown fuse	Visually inspect or try new fuse	Good fuse	Go to next step	
			Fuse is blown	Install new fuse	Page 22
7	Burnt out lamp	Visually inspect or try new lamp	Good lamp	Contact dealer or VanGuard Microscopes	
			Lamp is burnt out	Install new lamp	Page 21

Symptom: *No light visable from reflected (upper) illuminator*

Step #	Possible Cause	How To Test	Test Result?	Solution	For More Info
1	Light is not switched on	Visually inspect	Switched on	Go to next step	
			Not switched on	Move power switch to on position	Page 12
2	Illumination selector switch is not set to the “UP” position	Visually inspect	Set to “UP”	Go to next step	
			Set to “DOWN”	Switch the selector to “UP”	Page 12
3	Main power cord and/or illuminator plug not connected	Visually inspect	Plugged in	Go to next step	
			Not plugged in	Plug in power cord or illuminator plug	Page 11
4	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 16
5	Microscope not getting power	Inspect outlet	Good outlet	Go to next step	
			Outlet not good	Plug power cord into working outlet	Page 11
6	Blown fuse	Visually inspect or try new fuse	Good fuse	Go to next step	
			Fuse is blown	Install new fuse	Page 22
7	Burnt out lamp	Visually inspect or try new lamp	Good lamp	Contact dealer or VanGuard Microscopes	
			Lamp is burnt out	Install new lamp	Page 21

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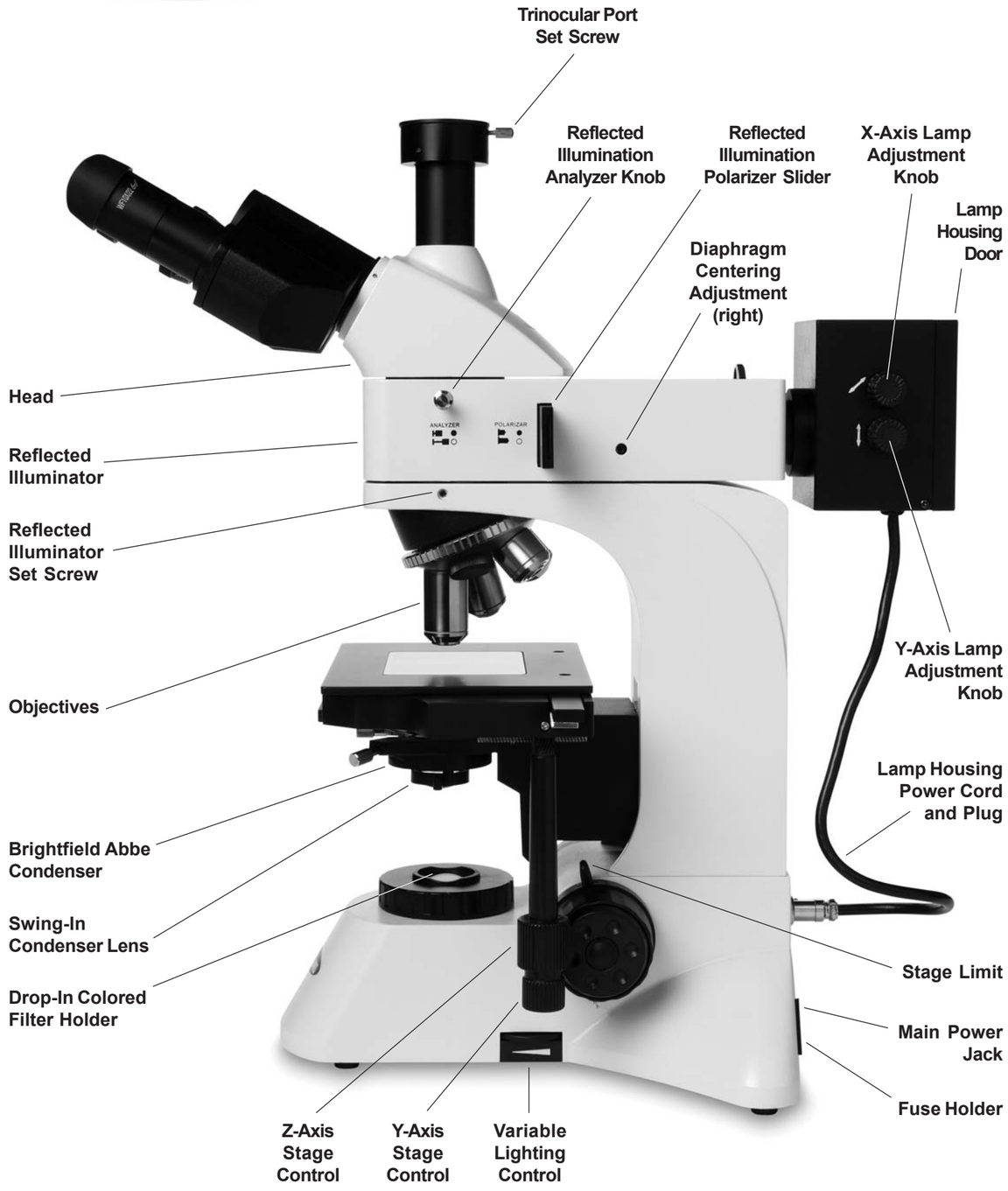
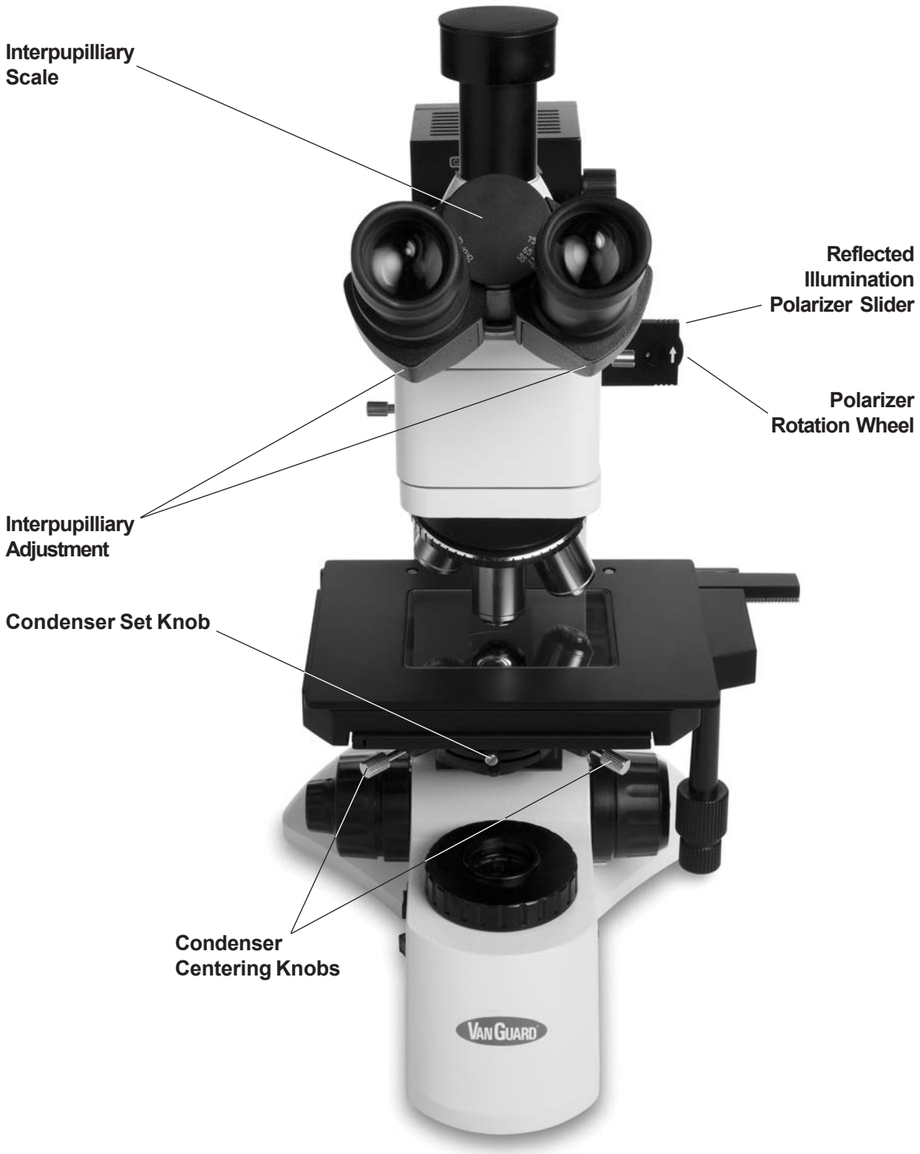
VanGuard® Components



Components



Maintenance

Caring for your 1442MMi Microscope

The eyepieces and objectives on this microscopes are coated. They should never be wiped while dry as any dirt or dust will scratch the coating. The surfaces should be blown off and cleaned with an air-bulb and camel-hair brush. It is recommended to then use a lens cleaning solution. **Never use anything other than lens cleaning solution on any optical component.** Apply with a cotton swab for a minimum of wetting, then wipe the surface clean with a quality lens tissue. These items are all available in our lens cleaning kit, see the Optional Accessories page for ordering information.

The same care instructions apply to all optical components of this microscope, including the illuminator and condenser lenses.

Never dissasemble objectives in an attempt to clean them. The placement and orientation of the internal lenses are absolutely critical to their performance, therefore keeping the exterior surfaces clean to prevent contaminate ingress is essential to the longevity of the objectives.

All other parts can be cleaned with a paper towel and mild detergent. It's not recommended to use rubbing alcohol for cleaning as it can damage the painted surfaces. Also be aware that rubbing alcohol will break down lubricants, so be careful when cleaning near the following parts:

- Stage rack and pinion gears
- Focus controls
- Objective turret
- Condenser rack gears
- Condenser rack controls

Xylene, since it breaks down the bonding material holding the lenses, should never be used as a cleaner.

Periodically your microscope should be fully serviced by a qualified service technician.

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.

It's not recommended to use a compressed gas canister as the liquid propellent can escape and will damage the optical coatings if sprayed onto the lens surfaces.

Maintenance

Replacing the Fuse

If the microscope is plugged in but the illuminator is not turning on, the fuse could be blown. The instructions below detail how to check for a blown fuse. You can usually tell a blown fuse by if the wire inside is broken, or the glass is blackened. Sometimes there will be no visible indication though and it will be necessary to check the fuse with a conductivity meter or to replace it with a new fuse.

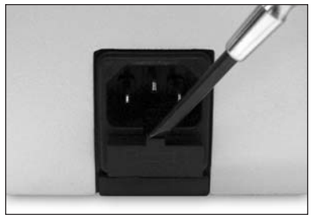


Figure 60

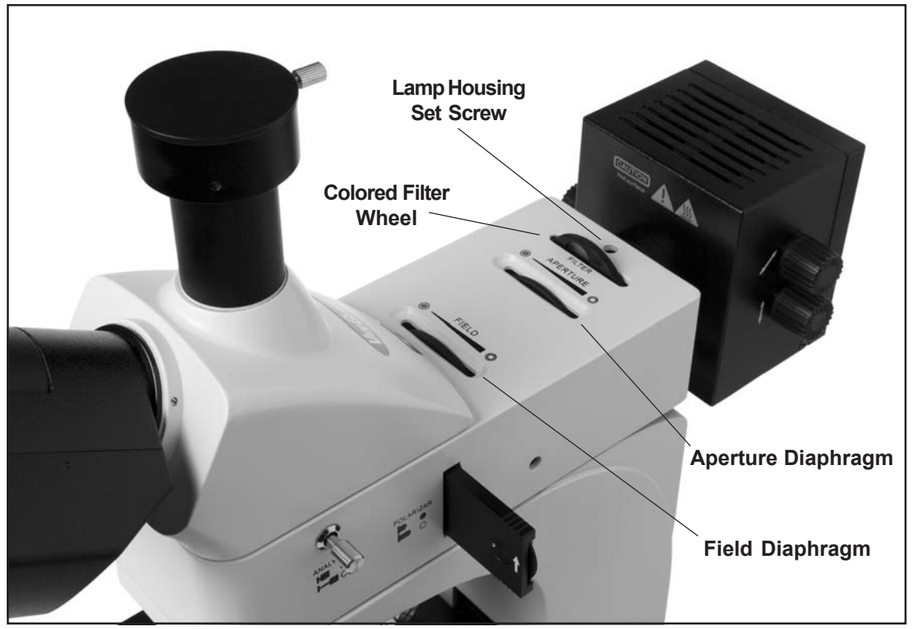
Figure 61

Before attempting to replace or remove the fuse, UNPLUG THE MICROSCOPE FROM ANY POWER SOURCE.

1. Remove the fuse holder from the rear of the microscope by using a slotted screwdriver to push downward on the fuse comparment door slot while prying outward (figure 60).
2. Remove the fuse from the fuse holder (figure 61).
3. If the fuse is blown replace by inserting a new fuse into the fuse holder.
4. Push the fuse holder back into the fuse holder slot until fully seated.

Replacement Fuse - 3A 250V (Cat. No. 1400-FS5)

Components



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

Assembly

Included Parts

Trinocular Head Assembly	1 ea.
Reflected Illuminator Assembly	1 ea.
Reflected Illuminator Lamp Housing	1 ea.
Stand	1 ea.
Brightfield Abbe Condenser	1 ea.
10X High Eyepoint Ultra-Widefield Eyepiece	2 ea.
5X Plan Infinity LWD Objective	1 ea.
10X Plan Infinity LWD Objective	1 ea.
20X Plan Infinity LWD Objective	1 ea.
40X Plan Infinity LWD Objective	1 ea.
Glass Stage Insert	1 ea.
Dispersion Filter	1 ea.
Blue Filter	1 ea.
Spare 30W/12V Halogen Lamp for Transmitted Illuminator (#1400-30W12VHL)	1 ea.
Spare 50W/12V Halogen Lamp for Reflected Illuminator (#1400-50W12VHL)	1 ea.
Spare 3A Fuse (#1400-FS5)	1 ea.
Power Cord	1 ea.
Rubber Eyecups	2 ea.
2mm Hex Wrench	1 ea.
3mm Hex Wrench	2 ea.
Operation Manual	1 ea.
Warranty Card	1 ea.
Dust Cover	1 ea.

Optional Accessories

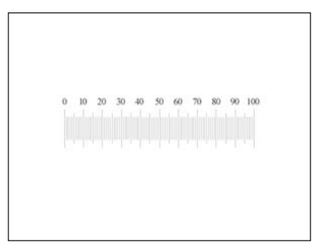
Contact us for current pricing and part numbers

Camera Kits
USB with Image Capture Software
DSLR
CCD Video
Video Eyepiece

Eyepiece Reticles
5mm Scale
10mm Scale
0.500” Scale
10mm Grid
Crosshair
Pointer
Metric & SAE Scale Calibration Plates

Objectives
50X LWD 0.70NA, 3.68mm Working Distance
60X LWD 0.75NA, 3.18mm Working Distance
80X LWD 0.80NA, 1.25mm Working Distance
100X LWD 0.85NA, 0.40mm Working Distance

Miscellaneous
Microscope Optical Cleaning Kit
4”x6” Lens Paper
Optical Tissue



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

Maintenance

Before attempting to replace or remove the lamp, UNPLUG THE MICROSCOPE FROM ANY POWER SOURCE and allow to cool.

Be careful not to touch the glass bulb when replacing - use a tissue or other medium to grasp the lamp. This will prevent the oils in your hand from reducing lamp life. If contact is made with the glass bulb, clean with rubbing alcohol and allow a brief drying period.

Replacing the Transmitted Illuminator Lamp

1. Remove the glass stage insert and unplug the main power cable and reflected illuminator power cable from the rear of the microscope stand. Carefully lay the microscope onto it’s back.
2. Open the lamp access compartment located on the bottom of the microsope base by turning the set knob (figure 57) counter-clockwise until the door comes loose.
3. When replacing, insert the new lamp into the lamp socket (figure 58). Make sure that the pins on the lamp line up with the holes on the lamp socket. The pins should slide freely into the holes with only slight resistance - do not force.
4. Close the compartment door and retighten the set knob. Follow the instructions in the Transmitted Illumination Setup section to properly center the lamp.

Replacement Lamp - 30W 12V Halogen (Cat. No. 1400-30W12VHL)

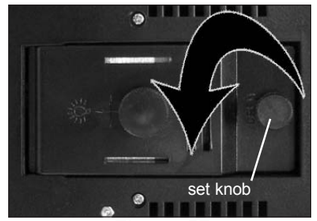


Figure 57

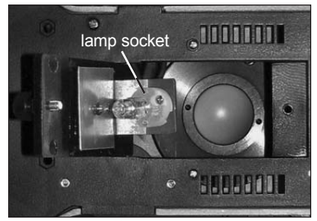


Figure 58

Replacing the Reflected Illuminator Lamp

1. Open the lamp housing door located at the rear of the reflected illuminator box by pulling downward (figure 59).
3. When replacing, insert the new lamp into the lamp socket. Make sure that the pins on the lamp line up with the holes on the lamp socket. The pins should slide freely into the holes with only slight resistance - do not force.
4. Close the compartment door and follow the instructions in the Reflected Illumination Setup section to properly center the lamp.

Replacement Lamp - 50W 12V Halogen (Cat. No. 1400-50W12VHL)

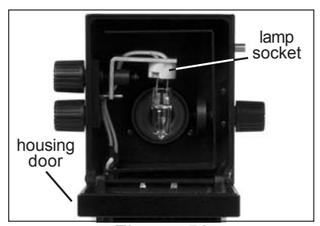


Figure 59

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

Microscope Use

Colored Filters - Transmitted

6. The transmitted Kohler light illuminator features a drop-in filter holder (figure 52) for use with the included colored absorption filters. These filters can be used for color correction and image enhancement during photomicrography and general use. The filters can be used alone or stacked in order to achieve desired results.

Figure 52

Colored Filters - Reflected

7. The reflected illuminator features a filter wheel (figure 53) containing colored absorption filter settings, a dispersion filter, and an open setting. As with the transmitted filters they are used for color correction and image enhancement.

Figure 53

Polarizer/Analyzer - Transmitted

8. Simple polarization is possible when utilizing the polarizer function in order to enhance contrast in certain types of specimens. The transmitted illuminator uses a removable polarizer that can be placed on top of the Kohler light field diaphragm (figure 54). The filter is then rotated to the desired level of extinction.

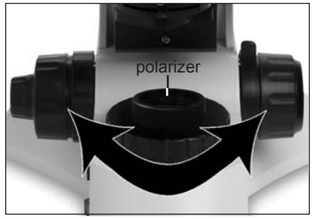


Figure 54

9. The analyzer knob, located on the right side of the reflected illuminator, must be pushed inward to engage this function (figure 55).

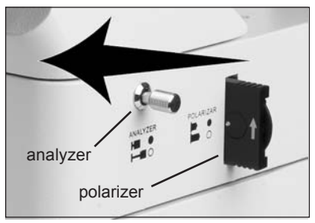


Figure 55

Polarizer/Analyzer - Reflected

10. As with the transmitted polarizer, the reflected illumination also features a simple polarization function. Located at the right side of the reflected illuminator is the analyzer knob which must be pushed inward as well as the polarizer slider (figure 56). Polarization is achieved by turning the rotation wheel at the end of the polarizer slider (figure 56) to the desired level of extinction.

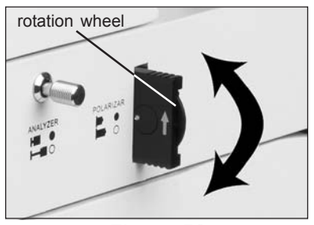


Figure 56

Assembly

Unpacking Components

1. Carefully remove all components from foam packaging and plastic bags. Use the diagrams and the parts list in the Components section of this manual to verify that all parts are present. Be sure to carefully check that you've removed all the parts from the foam packaging as some are small and can be easily overlooked. Please retain all packaging for future transport.

2. Place the stand on a stable and level work surface (figure 1).


Figure 1

Head and Reflected Illuminator Assembly

3. Remove the head from the stand by loosening the reflected illuminator set screw (figure 2) using the included 2mm hex wrench. **Grasp the head firmly before loosening the set screw to prevent it from falling.** Set the head aside.

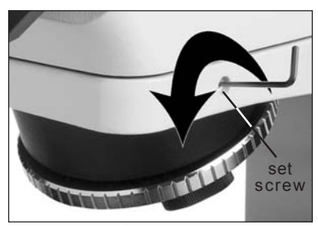


Figure 2

4. Remove the translucent packing cap from the bottom of the reflected illuminator. Loosen the head set screw (figure 3) and remove the black packing cap from the top of the illuminator. These can be set aside with the packaging as they will not be needed.

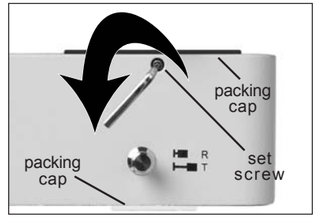


Figure 3

5. Insert the dovetail flange located on the bottom of the reflected illuminator into the top of the stand with the black side facing down (figure 4). The end of the illuminator with the round opening should be facing towards the rear of the stand. Use the 2mm hex wrench to tighten the illuminator set screw firmly.


Figure 4

6. Insert the dovetail flange on the lamp housing into the hole located on the rear of the reflected illuminator. Hold in place while tightening the lamp housing set screw (figure 5) with the 2mm hex wrench.

Figure 5

Setup

Head and Reflected Illuminator Assembly *(cont.)*

7. Insert the round electrical plug from the lamp housing into the jack located on the rear of the stand (figure 6). Tighten the outer collar to prevent the cable from coming loose.

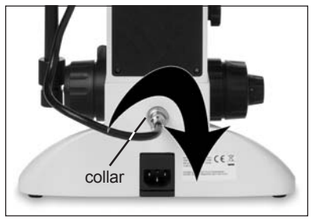


Figure 6

8. Insert the dovetail flange located on the bottom of the head into the hole at the top of the reflected illuminator. The eyetubes should be facing forward. **While still holding the head** tighten the head setscrew with the 2mm hex wrench (figure 7).


Figure 7

9. Remove the two packing caps from the eyetube openings and set aside with the other packaging as they will not be needed. Slide the eyepieces into the eyetubes and ensure they are fully seated. If you wish you may attach the eyecups to the ends of the eyepieces, though this step is optional and eyeglass wearers especially may choose not to install the them (figure 8).

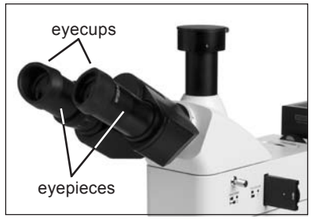


Figure 8

Objective Installation

10. Adjust the coarse focus knobs so that the stage is completely lowered.

11. Remove the objectives from their packing canisters and thread each one into the nosepiece holes ensuring they are fully seated (figure 9). Typically they are installed in numerical order from lowest to highest magnification.

Figure 9

Stage Plate Installation

12. With the stage completely lowered place the glass stage plate into the rectangular recess on top of the stage (figure 10). Clean the plate first if necessary.

Figure 10

Microscope Use

Focusing and Mechanical Stage Mechanisms

1. Focusing adjustment is achieved by turning the coarse/fine focus controls located on both sides of the microscope. The large knob is used for coarse adjustment, the smaller knob for fine adjustment (figure 48). The coaxial arrangement allows for easy, precise adjustment without stage drift.

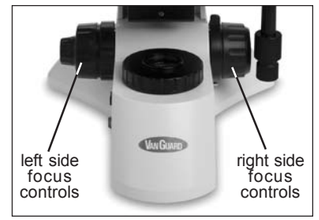


Figure 48

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 0.2mm; the smallest graduation refers to 2 microns of vertical movement. One half turn of the coarse focusing knob raises or lowers the stage 20mm. To ensure long life, turn the focusing knobs slowly and uniformly. Care should always be taken when using the focus controls to prevent the objectives from making contact with the stage or specimen.

3. The mechanical stage X-Y controls, located underneath the right-hand side of the stage (figure 49), provide easy and accurate positioning of the specimen. One complete turn of the longitudinal (Y-axis) control (lower half of the stage controls) will move the specimen 20mm left or right. One complete turn of the transverse (X-axis) control (upper half of the stage controls) will move the specimen 33mm front or back.

Figure 49

Abbe Condenser Swing-In Lens

4. The transmitted illumination Abbe condenser features a swing-in lens located at the bottom of the condenser (figure 50). This lens should be swung into the light path when using the 5X objective only. This is necessary to obtain the correct Numerical Aperture required for the low powered objective. In addition you will need to fully open the aperture iris in order to prevent vignetting and leave the condenser height the same as when originally setup using the 10X objective.

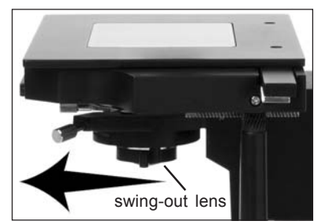


Figure 50

5. To control contrast in your specimen image while operating with the 5X objective use the field diaphragm (figure 51) instead of the aperture diaphragm that is typically used.

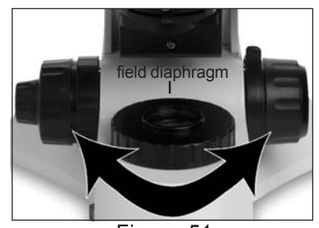


Figure 51

Kohler Illumination Setup *(continued)*

36. Open the field diaphragm until the iris is just barely no longer visible (figure 45).

37. To eliminate stray light glare close the aperture iris until you have achieved acceptable contrast in your specimen.

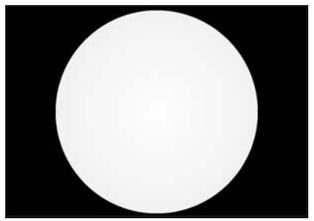


Figure 45

Trinocular Camera Port Setup

Installation and setup of your camera system, if applicable, will vary depending on the camera type and adapters that are utilized. Please refer to the instructions that came with your camera adapter system for specific details.

38. In general though, most systems will require the removal of the trinocular port dust cap which is held in place by a set screw located at the rear of the port (figure 46).

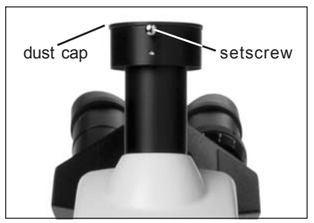


Figure 46

39. Use the prism selector knob, located on the left side of the microscope head (figure 47), to divert the image from the eyepieces to the camera. The system uses a 100/0 split sliding prism to divert 100% of the light to the camera port when selected. This provides the brightest image possible to the camera which can be critical for certain photomicrographic applications.

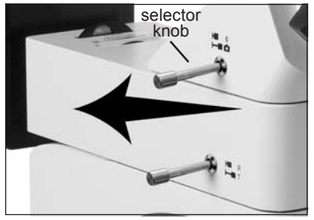


Figure 47

This concludes the setup of your VanGuard 1442MMi industrial microscope. At this point your microscope is ready for use. Continue for instructions on the proper use of the instruments main components.

Abbe Condenser Installation

Your microscope will have come with the brightfield condenser installed but should you need to reinstall at any point follow the directions below.

13. Rotate the nosepiece so that either the 5X objective or an empty slot is in the light path.

14. Using the coarse focus knobs raise the stage completely. Be careful to not crash the stage into the objectives. If the stage won't raise fully check to see if the stage limit is set too low. Refer to the Stage Limit instructions in the Setup section of this manual for more information.

15. Adjust the substage control so that the substage assembly is in the full downward position (figure 11).

16. Slip the brightfield condenser into the collar from below. The narrow end of the condenser should be facing upward. With the iris control facing forward, and centered properly, tighten the condenser set knob (figure 12).

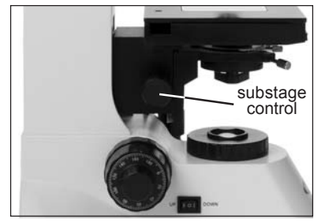


Figure 11

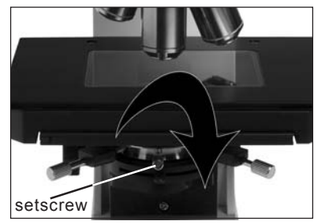


Figure 12

Power Cord Installation

17. Check to see that the main power switch is in the off ("0") position (figure 13).

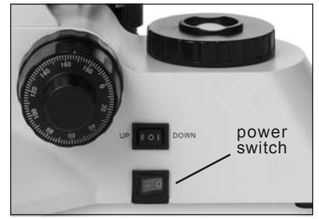


Figure 13

18. Connect the main power cord to the jack located at the rear of the microscope stand (figure 14) and plug the other end into a grounded power source.

19. The microscope electrical system will accept either a 110V/60Hz or a 220V/50Hz AC voltage source. If you ordered a 110V microscope it will have come with a 3-Pin North American (NEMA 5) style power cord. A grounded Schuko (CEE 7/7) style cord is included with the 220V microscopes.

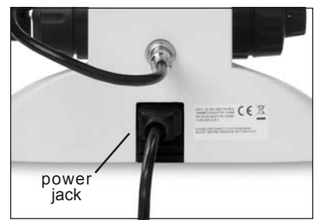


Figure 14

This concludes the basic assembly of your VanGuard 1442MMi industrial microscope. Continue on to setup the optical alignment, illumination, and ergonomic features for proper use.

Reflected Illumination Setup

1. Set the main power switch to the ON position (“|”) and the illuminator selector switch to the UP position (“||”) (figure 15).

The reflected illuminator housing will get hot if left on for extended periods of time. Be careful when making adjustments to the illuminator housing or lamp fixture.

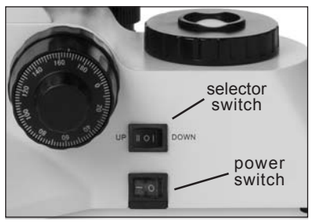


Figure 15

2. Adjust the VLC (variable lighting control) (figure 16) counter-clockwise to the maximum position.

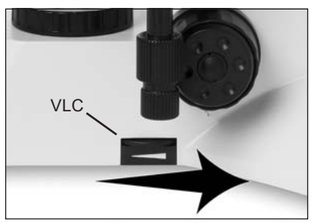


Figure 16

3. Ensure that the illumination selector knob is pushed all the way inward (“R”) (figure 17).

Figure 17

4. Rotate the Aperture and Field diaphragm dials to the right (figure 18) to fully open the iris’s.
5. Rotate the color filter wheel until the blank position is in the light path (figure 18).
6. Pull the Polarizer filter slider out until you feel a click. Pull the Analyzer selector knob fully out (figure 18).
7. Rotate the 5X objective into the light path. You may have to lower the stage in order not to crash the higher magnification objectives into the stage.

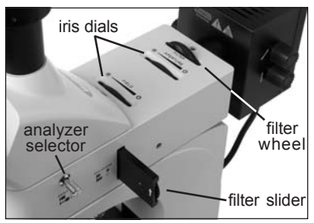


Figure 18

8. Look through the eyepieces and you should see a white field of view. You may have to adjust the illuminator intensity dial in case the light is too dim or too bright. If the brightest portion of the field of view isn’t centered (figure 19) you will need to perform the following instructions.

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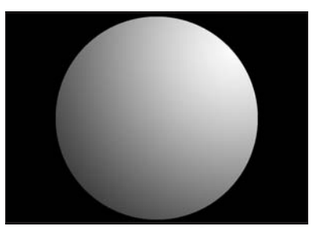
Figure 19

Transmitted Illumination Setup *(continued)*

30. Lean the microscope back to expose the lamp adjustment control located on the bottom of the microscope stand taking care not to let the glass stage plate and/or speciments fall. Loosen the transmitted lamp adjustment knob located on the lamp compartment door by turning counter clockwise (figure 40).

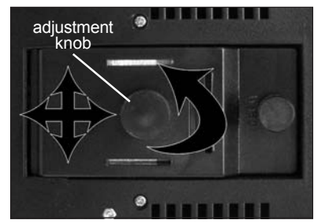

Figure 40

31. Move the knob in latitudinal and/or longitudinal directions (figure 40) until the field of view as seen through the eyepieces is at it’s brightest overall and the brightest portion is well centered in the field of view (figure 41). This step may be aided by placing a bright white piece of paper on the stage directly under the objective and the light field viewed through that.
32. Retighten the lamp adjustment knob by turning clockwise.

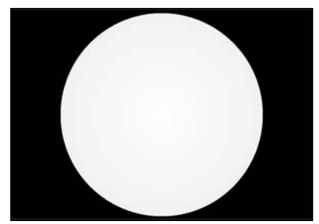
Figure 41

Kohler Illumination Setup

When using the transmitted illuminator proper condenser alignment, iris settings, and focusing are necessary to obtain true Kohler illumination and achieve the highest quality image of your specimen.

33. Open the transmitted illuminator aperture and field diaphragms fully (figure 42), rotate the objective turret so that the 10X objective is in the optical path, and focus on a specimen.

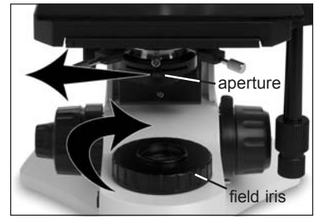

Figure 42

34. While viewing through the microscope and slowly closing the field diaphragm, adjust the substage condenser vertical control until the edge of the field iris is in focus (figure 43).

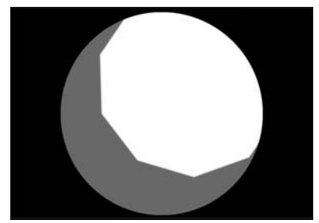
Figure 43

35. The two control knobs can be turned in unison or independantly to position the condenser in alignment with the field diaphragm and light path (figure 44).

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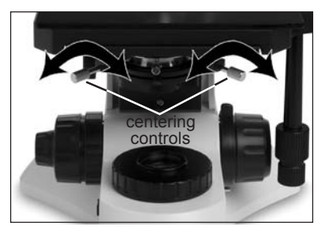

Figure 44

Transmitted Illumination Setup

23. Set the main power switch to the ON position (“|”) and the illuminator selection switch to the DOWN position (“|”) (figure 35). Adjust the VLC (variable lighting control), located on the right side of the microscope base, counter-clockwise to the maximum position.

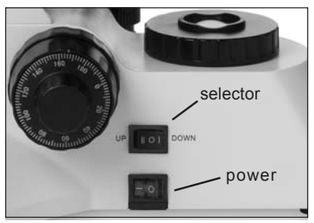

Figure 35

24. Check to see that the illuminator selector knob is pulled out all the way (“T”) (figure 36).

Figure 36

25. Rotate the field diaphragm dial clock-wise to fully open the iris (figure 37).

26. Shift the aperture diaphragm slider to the left to fully open the iris (figure 37).

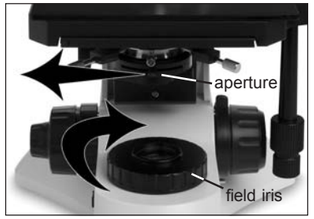

Figure 37

27. Remove the transmitted polarizer filter from the collector if applicable. Pull the Analyzer selector knob fully out (figure 38).

28. Rotate the 5X objective into the light path. You may have to lower the stage in order not to crash the higher magnification objectives into the stage.

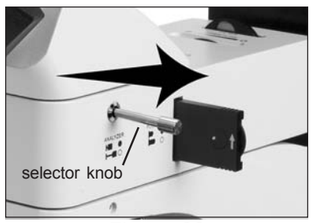

Figure 38

29. Look through the eyepieces and you should see a white field of view. You may have to adjust the variable lighting control in case the light is too dim or too bright. If the brightest portion of the field of view isn’t centered (figure 39) you will need to perform the following instructions.

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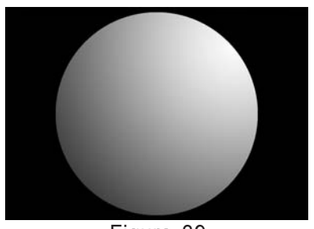
Figure 39

Reflected Illumination Setup *(continued)*

9. Adjust the three reflected illuminator alignment knobs located on the illuminator housing in order to properly align the lamp. The knob on the left (figure 20) focuses the lamp transversely (Z-axis) while the upper right knob adjusts for latitudinal (X-axis) and the lower for longitudinal (Y-axis) movement (figure 21).

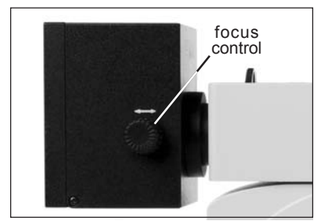

Figure 20

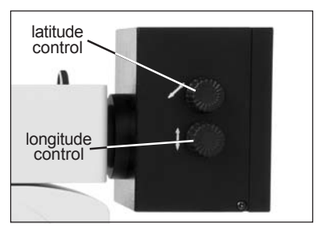

Figure 21

10. Rotate each of these in succession until the field of view is at it’s brightest overall and the brightest portion is centered in the field of view (figure 22). This step may be aided by placing a bright white piece of paper on the stage directly under the objective and the light field viewed on that.

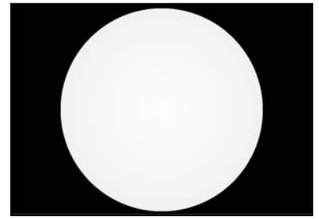
Figure 22

Reflected Field Diaphragm Alignment

11. Next, the reflected illuminator field diaphragm needs to be properly centered in the light path. Ensure that the reflected illuminator aperture diaphragm is fully open by rotating the Aperture dial to the right (figure 23).

Figure 23

12. While looking through the eyepieces close the field diaphragm by rotating the Field dial to the left until you begin to see a darker perimeter in the field of view resembling an iris silhouette(figure 24).

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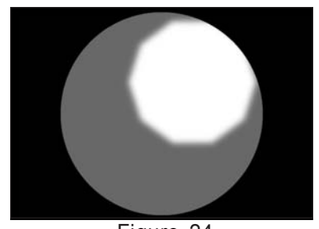
Figure 24

Reflected Field Diaphragm Alignment *(continued)*

13. If it is not well focused use the main focus controls to bring it in so. Set the iris opening to where it almost completely fills the field of view (figure 25).

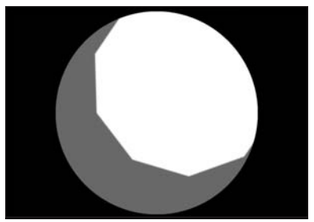

Figure 25

14. If the iris is not properly centered in the field then use the two included 3mm hex wrenches to center it. Place one into each of the access holes located on either side of the reflected illuminator (figure 26). Make sure they completely engage the hex screws located within.

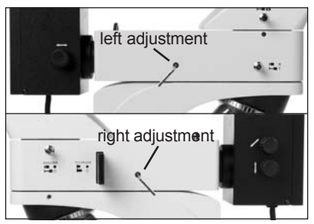

Figure 26

15. While looking at the field diaphragm silhouette through the eyepieces, rotate the two hex wrenches back and/or forth until the diaphragm is properly centered (figure 27). You can make adjustments to the diaphragm using the Field dial in order to aid in this process.

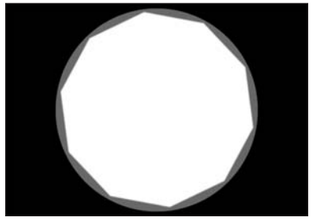

Figure 27

Eyecups *(optional)*

16. The rubber eyecups can be mounted to the eyepieces (figure 28) in order to prevent stray light from entering and therefore providing a higher contrast image. Eyeglass wearers who choose to wear their glasses during microscope use should remove the eyecups in order to maintain proper eyepoint positioning to the eyepiece. You will want to be careful not to make contact between the eyepiece lenses and your eyeglasses to protect the delicate optical coatings though.

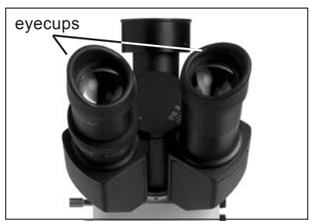

Figure 28

Interpupilliary Adjustment

17. Place a specimen on the stage and while looking through the eyepieces fold the eyetubes together or further apart (figure 29) to make the two images converge into one field of view. This adjustment will be different for all users and should be checked and readjusted before each use.

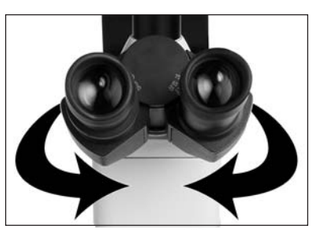

Figure 29

Focus Adjustment

18. Focusing on your specimen is achieved through rotating the coarse and/or fine focusing knobs. These are located on either side of the stand in a coaxial layout (figure 30). The outer-most dials control the fine focus and the larger dials located just inward control the coarse focus adjustments.

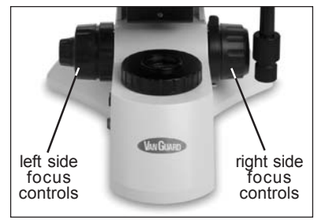

Figure 30

Focus Tension Adjustment

19. The inner-most dial located on the left focus adjustment (figure 31) controls the stage movement tension. This should be adjusted to where the focus controls are smooth and easy to turn but not so loose that the stage drifts out of focus.

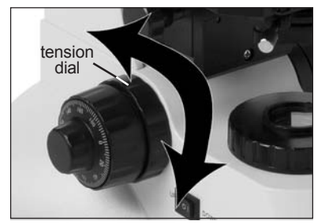

Figure 31

Stage Limit

20. Located inward of the right hand coarse focus adjustment (figure 32) is the stage limit which prevents the stage from crashing into the objectives.

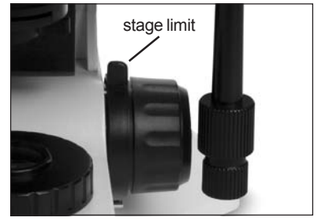

Figure 32

21. To adjust, first unlock the limit by rotating it counter-clockwise (figure 33). With the highest power objective in the light path adjust the stage until the image through the eyepieces is in focus then lock the limit by rotating the control clockwise until tight (figure 33). The upward motion of the stage when using the coarse focus controls is now limited to this point. The fine focus controls are not affected though and will still allow upward movement of the stage.

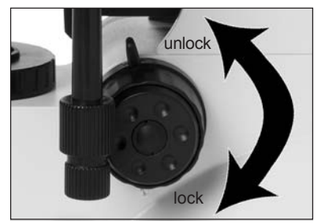

Figure 33

Diopter Adjustment

22. Before each use of the microscope it's important to check and readjust the diopter if necessary. With the main focus controls, and viewing only with your right eye, bring the specimen into focus. Then view the image using only your left eye and rotate the diopter ring located around the left eyetube (figure 34) to bring the image into focus.

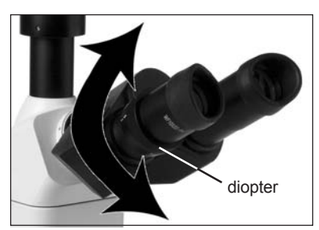

Figure 34