

A-Zoom μ Micro Microscope

REFERENCE MANUAL

Optical, mechanical, and
operational instructions for
the A-Zoom Micro Microscope

Congratulations on specifying an A-Zoom Micro microscope for your probing and analytical workstation. You now possess a precision instrument to maximize your analytical imaging effectiveness and productivity.

In the tradition of the field-proven A-Zoom Microscope line, the A-Zoom Micro has been designed to deliver performance, reliability and value.

Please read this manual carefully to fully familiarize yourself with the features, operation and set-up of the A-Zoom Micro Microscope.

For technical assistance, contact your local dealer or the Excelitas Technologies, Inc. (Excelitas) Customer Service Department at: www.excelitas.com/contact.



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preface i - About This Manual

i.01 Typographical indications

To help you locate, interpret and identify select information easily from this document, this manual uses consistent visual cues and standard text formats. These conventions are as follows:

Bold, All Caps or *italic* - Used for emphasis of particular words for clarification of instruction.

BOLD ALL CAPS -Indicates specific instructions relating to an associated Warning or Caution Symbol (see i.02).

i.02 Important Symbols

You will find special information and symbols (in accordance with the ISO (International Standards Organization) within the body of this manual, to indicate Warnings, Cautions and Notes of interest. These terms and symbols are explained below.



CAUTION: Alerts you to the potential for damage to the product hardware of peripheral equipment. Special instructions may be included to minimize risks associated with this caution.



WARNING: Warns you of the possibility of other personal injury when performing a task related to the subject matter of this manual.

1.0 - Important Safety Information

1.01 Read Instructions

All safety and operating instructions should be read before using or operating this instrument.

1.02 Retain Instructions

The safety and operating instructions should be retained for future reference.

1.03 Heed Warnings

All warnings on the product and the operating instructions must be adhered to.

1.04 Follow Instructions

All operating and use instructions should be closely followed.

1.05 Cleaning

Disconnect this product from all power sources before cleaning. Use of liquid cleaners or aerosol cleaners is strictly prohibited. Use a clean, damp cloth and appropriate lens wipes for cleaning objectives and external surfaces only.

1.06 Water and Moisture

Do not use this product near any water source- for example, near a sink, basin, in a wet environment and the like.

1.07 Attachments

Do not use attachments with this product that are not recommended by the manufacturer as they may cause hazards.

1.08 Accessories

Do not place this product on an unstable or insecure cart, stand, countertop, desk, or table. The instrument may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a stand, bench top, desk, or table recommended by the manufacturer, or sold with the product. Any mounting of this instrument should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

1.09 Moving and Transport

Moving or transporting this instrument on a cart should be handled with care. Quick stops, excessive force, and uneven surfaces may cause extensive damage to the product.

1.10 Ventilation

Slots and openings in the enclosures of this instrument and its accessories are provided for proper ventilation and to ensure reliable and safe operation of the product and to prevent it from overheating. These openings must not be blocked or covered at any time, before, after, or during operation. The vent openings should never be blocked by placing the product on a rug, cloth, or other similar surface that might block or hinder proper ventilation. This product should not be placed in a built-in installation such as a bookcase, enclosure, or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.

1.11 Power Sources

This product should be operated only from the type of power source indicated in this reference manual. If you are not sure of the type of power supply available, consult your product dealer or local power company.

1.12 Grounding or Polarization

This instrument is equipped with a 3-wire grounding type plug, (a plug having a third "grounding" pin). This plug will only fit into a grounded power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat or bypass the safety purpose of this product's grounding-type plug.

1.13 Power and Connection Cord Protection

Power supply cords should be situated so that they are not likely to be walked on or pinched by items placed upon, over or against them. Particular attention should be paid to cords at plugs, convenience receptacles, and the point where they exit from the product. Be sure the power cord is accessible at all times. The power cord is the disconnecting device for this product.

1.14 Lightning and Surge Protection

For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug the instrument and its accessories from the wall outlet. This will prevent damage to the product due to lightning and power-line surges. The manufacturer further recommends that this product be used with a surge protection device certified and approved for the required power load.

1.15 Overloading

Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

1.0 - Important Safety Information (Cont.)

1.16 Object and Liquid Entry

Do not allow foreign objects or liquid to contact or enter the unit.

1.17 Inflammable and Explosive Substances

Do not allow flammable or explosive substances to contact or be near the unit.

1.18 Heavy Shock/Vibration

The A-Zoom Micro Microscope is a very delicate instrument and should be handled with care. Any significant shock and vibration influence could cause serious damage to the instrument.

1.19 Servicing

Contact your local dealer or Excelitas regarding any and all service issues. **DO NOT REMOVE THE A-Zoom Micro COVER. DOING SO WILL VOID THE MICROSCOPE WARRANTY.**

1.20 Damage Requiring Service

An authorized representative from Excelitas must authorize all warranty repairs. A Excelitas representative will determine whether the service issue requires return of the unit or whether the unit may be field repaired.

1.21 Replacement Parts

Contact your local dealer or Excelitas for a complete list of replacement parts.

1.22 Mounting

The A-Zoom Micro Microscope is mounted using the four (4) #8-32 X 1/2 screws supplied with the system. See page 11 for more details.

1.23 Heat

The A-Zoom Micro Microscope is designed to operate in a laboratory environment. The ambient temperature range should be between 65°F and 100°F, with a relative humidity not more than 50%. The product should be situated away from heat sources. Conditions outside this range could damage the microscope and accessories.

2.0 - Operational Safety and Important Safeguards



CAUTION: PLEASE READ AND OBSERVE ALL WARNINGS AND INSTRUCTIONS CONTAINED IN THIS MANUAL AND THOSE ON YOUR A-Zoom Micro PRODUCT. RETAIN THIS MANUAL FOR FUTURE REFERENCE.

This unit has been engineered and manufactured to assure your personal safety. However, improper use can result in potential electric shock or fire hazards. In order not to defeat the safeguards incorporated in this instrument and its accessories, observe the following basic rules for its installation, use and servicing. Your A-Zoom Micro Microscope is fully transistorized and does not contain any user serviceable components.

2.01 Post Shipping Inspection

After unpacking the A-Zoom Micro Microscope, examine it carefully for possible damage. If any damage is detected, **DO NOT PLUG THE PRODUCT INTO THE WALL OUTLET.** Contact your sales or technical representative.

2.02 Power Sources

The A-Zoom Micro Microscope has been designed to operate within a range of:

- 90 - 250 Volts A.C., at 47 - 63 Hertz.
- 2.5 amps is required for operating voltages between 100 - 120 Volts
- 1.25 amps is required for operating voltages between 220 - 240 Volts.

2.03 Power Plug

This product is equipped with a 3-wire grounding type plug. This plug will only fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug in the outlet, do not defeat the safety purpose of the grounding plug. Contact your electrician to replace your obsolete outlet.

2.04 Power Cord Protection

The power cord should be situated so as not to be walked on or be pinched by items placed on or against them. Pay particular attention to cords at plugs, convenience receptacles, and the point where they exit the instrument.

2.05 Overloading

Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock.

2.0 - Operational Safety and Important Safeguards (Cont.)

2.06 Ventilation

Operate the microscope in a well-ventilated area. Provide clear space around all the microscope components for unobstructed air circulation.

2.07 Water and Moisture

Do not operate the microscope system near or around any water source or in excessive moisture. Do not set liquids on top of the unit.

2.08 Cleaning

Prior to cleaning the unit remove the power cord from the power source. Clean the outside surfaces using a mild cleanser and a soft cloth. Clean all optical components using an appropriate lens wipe.



DO NOT ATTEMPT TO CLEAN ANY OPTICS INSIDE THE MICROSCOPE.

2.09 Object and Liquid Entry

Never push objects of any kind into the openings of this instrument as they may touch dangerous voltage points or short components that could result in a fire or electric shock. Never spill liquid of any kind on this product.

2.10 Flammable and Explosive Substances

Do not allow flammable or explosive materials to be touching or near the unit.

2.11 Heavy Shock/Vibration

The A-Zoom Micro Microscope is a very delicate instrument and should be handled with care. Any significant shock and vibration influence could cause serious damage to the instrument.

2.12 Servicing

Obtain service only from authorized service personnel. Contact your local dealer or Excelitas

2.13 Damage Requiring Service

Contact your local dealer or Excelitas for a "Return Merchandise Authorization" (RMA) Number. After receiving the RMA number, return the complete microscope system for repair.

2.14 Replacement Parts

Contact your local dealer or Excelitas for a complete list of replacement parts.

3.0 - Regulatory Compliance

3.01 CE Marking

This product meets the essential requirements of applicable European Directives and standards, as amended for CE marking.

3.02 Safety Compliance

This product meets the essential requirements for safety per EU Directive 2006/95/EEC, Low Voltage Safety.

3.03 Electromagnetic Compatibility (EMC)

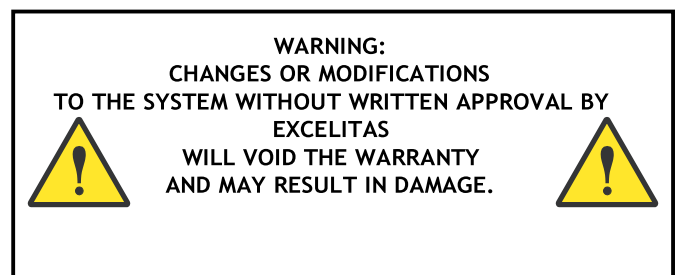
This product meets the essential requirements of the US (FCC CFR 47 Part 15 Subpart B) and EU (Directive 2004/108/EC) for electromagnetic compatibility for electrical equipment for measurement, control and laboratory use, Class A.

3.04 Environmental Compliance (RoHS)

The EU RoHS Directive (2002/95/EC) restricts the use of certain hazardous substances in new electrical and electronic equipment put on the market in the European Union. The RoHS directive applies to eight out of ten categories of electrical and electronic equipment but excludes category 9, Monitoring and Control Instruments, which this product falls. Excelitas is actively working to release RoHS-compliant products, even though the product is exempt from the RoHS directive.

3.05 Environmental Compliance (WEEE)

The EU WEEE Directive (2002/96/EC) encourages the re-use, recycling and recovery of waste from electrical and electronic equipment. The WEEE directive applies to ten categories of electrical and electronic equipment, including Category 9, Monitoring and Control Instruments, which this product falls. Excelitas is actively working to comply to the WEEE directive.



5.0 - General Information on A- Zoom Micro

The A-Zoom Micro Microscope can be supplied in many different variations. Be sure to read and understand each component of the microscope during setup and before operation. Also ensure that all connections have been made properly before plugging into a power source.

6.0 - A- Zoom Micro Features

A-Zoom Micro Microscope is available with the following features and equipment:

Standard 38mm ISO
Camera Port.

On-board 10-Watt LED
Illumination
Control Knob

Optimized for use with
Optem LWD Objectives:

- 28-21-02-000 - 2X / 0.055NA
MPlan APO
- 28-21-05-000 - 5X / 0.14NA
MPlan APO
- 28-21-10-000 - 10X / 0.30NA
MPlan APO
- 28-21-11-000 - 20X / 0.42NA
MPlan APO
- 28-21-50-000 - 50X / 0.55NA
MPlan APO

- 28-20-44-000 - 5X / 0.225NA
High-Resolution
- 28-20-45-000 - 10X / 0.45NA
High-Resolution
- 28-20-46-000 - 20X / 0.60NA High-Resolution

Objectives sold separately



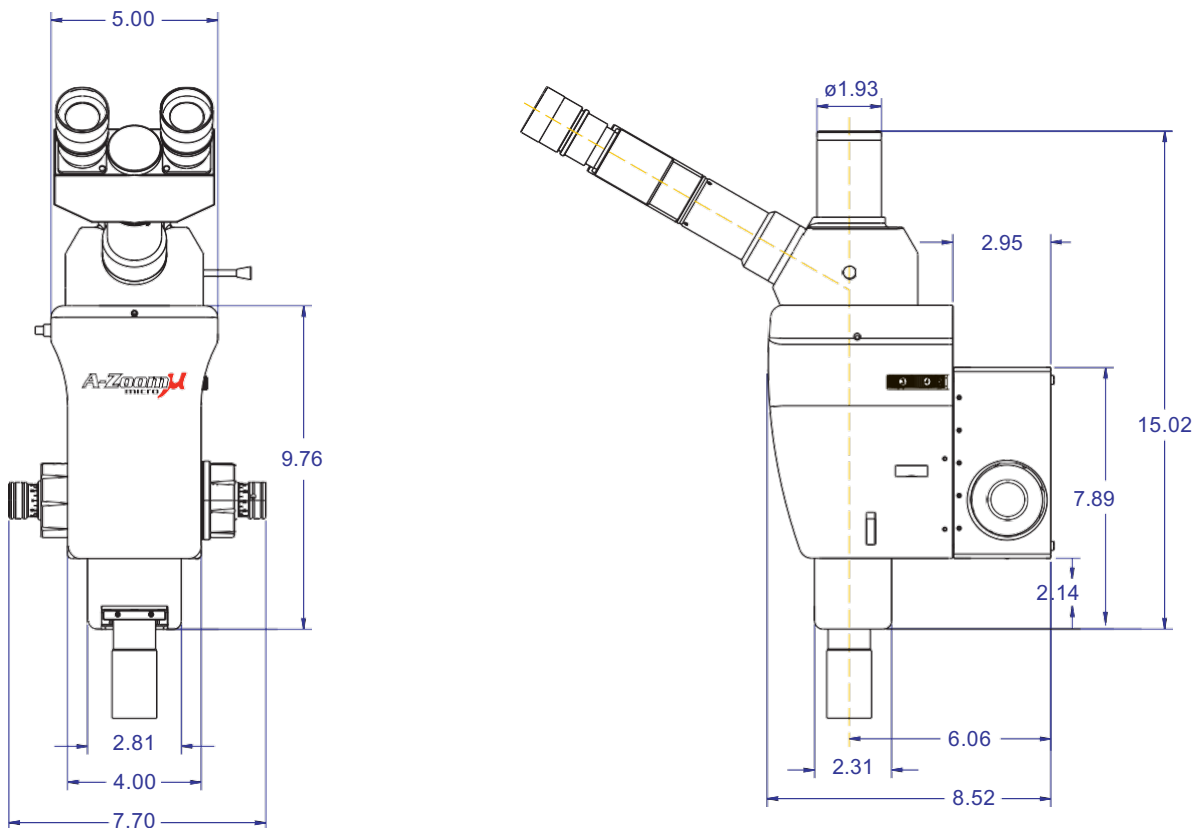
Available with fixed or tilting binocular, trinocular and Camera-Port only Heads. Refer to Page 14 of this manual for details.



FIGURE 1

7.0 - System Overview & Specifications

System Dimensions (58-01-00-000 shown with Optem® 10X/0.45NA high-Resolution Objective)



A-Zoom Micro Optical Performance Specifications

Infinity-Corrected Objective	Working Distance	Visual Magnification	Visual Field-of-View (Ø)	Video Field-of-View Low High
Optem 5X High Res 28-20-44-000	34mm	54X-381X	4.0-0.58mm	2.4x3.2 - 0.35x0.46mm
Optem 20X High Res 28-20-46-000	13mm	218X-1525X	1.0-0.14mm	0.6x0.8 - 0.09x0.12mm
Optem 2x M-Plan Apo 28-21-02-000	34mm	22X-152X	10.1-1.44mm	6.1x8.1 - 0.87x1.15mm
Optem 10x M-Plan Apo 28-21-10-000	34mm	109X-762X	2.0-0.29mm	1.2x1.6 - 0.17x0.23mm
Optem 50x M-Plan Apo 28-21-50-000	13mm	545X-3812X	0.4-0.06	0.24x0.32 - 0.03x0.05

- Recommended for use with Optem High Resolution Objectives (M-Plan Apo objectives will exhibit empty magnification in the upper 20% of the zoom range)
- Values given assume 2X flip-in is NOT engaged.

- Camera FOV is calculated for 1/2" format camera as recommended
- When using Widefield eyepiece adapter, Visual FOV is increased by 1.5X factor
- When using Optem 0.67X DC coupler, Camera FOV is increased by 1.5X factor

8.0 - Operating Considerations

8.01 Power Supply

The A-Zoom Micro Microscope has been designed to operate within a range of 90-250 Volts A.C., at 47-63 Hertz.

- 2.5 amps is required for operating voltages between 100 - 120 Volts
- 1.25 amps is required for operating voltages between 220 - 240 Volts.

8.02 Handling

The A-Zoom Micro Microscope is a very delicate instrument and should be handled with care. Any significant misuse could cause serious damage to the instrument.

8.03 Setup/Installation and Storage

Avoid installing or storing the instrument in the following environments:

- Environments exposed to direct sunlight.
- Environments where combustible or corrosive gas exists.

- Excessively warm or cold environments.
- Operating ambient temperature: 20° C to 35° C.
- Relative humidity not to exceed 50%.
- Environments exposed to excessive vibration or shock.
- Environments exposed to strong electric or magnetic fields.

8.04 Cleaning

Prior to cleaning the unit remove the power cord from the power source. Clean the outside surfaces using a mild cleanser and a soft cloth. Clean all optical components using an appropriate lens wipe.



**DO NOT ATTEMPT TO CLEAN ANY OPTICS
INSIDE THE MICROSCOPE.**

8.05 Obtaining Optimal Performance

For Extended Periods

Once the microscope has been optimized, avoid moving or jarring the unit in any way. For best results the operating environment should be dust and dirt free.

9.0 - A- Zoom Micro Mounting

9.01 Attaching Focus Block to prober

The A-Zoom Micro mounts to your probe station using four (04) #8-32 x 1/2 socket head cap screws provided. (See Fig. 4 for the dimensional specifications)

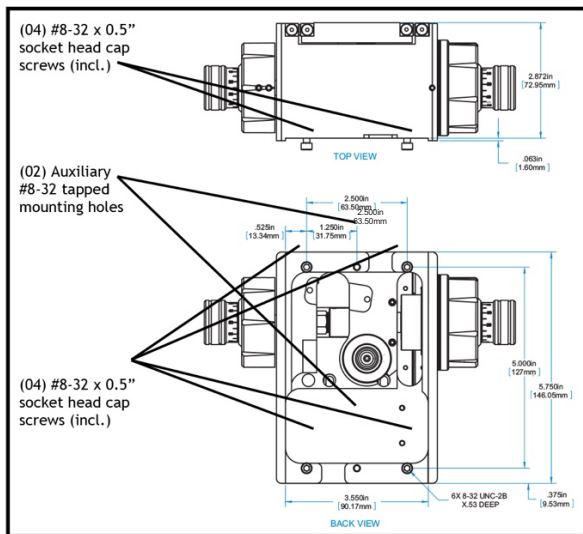


FIGURE 4

FIGURE 4

Follow the steps below when mounting your A-Zoom Micro to the probe station to avoid damage or injury. (Fig 5)

- 1) Thread top two screws into the focus block.
- 2) Slide the microscope into the slots at the top of the stand.
- 3) Thread remaining two screws into the bottom two holes.
- 4) Tighten all screws.

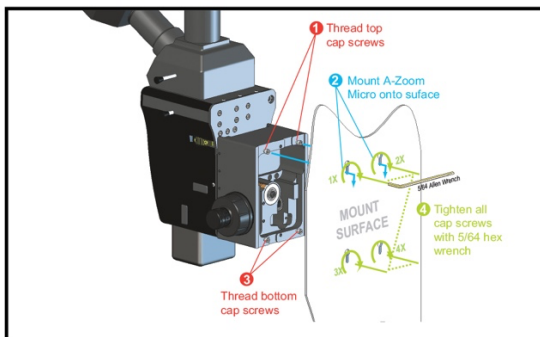


FIGURE 5

Focus Block Operation

The focus block is factory set to lift a 30lbs. load. To increase the load capacity of the focus block, simply increase the drag on the coarse focus knob as indicated in step 10.04.



THE MAXIMUM SAFE OPERATING CAPACITY OF THE A-ZOOM MICRO FOCUS BLOCK IS 100LBS (45KG). DO NOT EXCEED THIS LOAD LIMIT AS IT CAN RESULT IN DAMAGE OR INJURY.



9.02 Coarse Adjust: Increasing Focus Block Load Capacity
Use the Coarse Adjust feature on A-Zoom Micro Heavy-Duty Focus Blocks to increase the load capacity of the focus block. (Fig. 6).

- 1) Loosen nylon tipped setscrew using a 1/16" hex wrench.
- 2) Rotate retainer clockwise to increase the drag.
- 3) Tighten nylon tipped set screw.

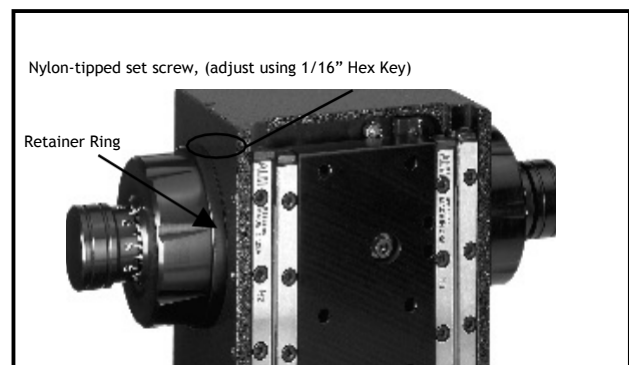


FIGURE 6

10.0 - Connecting Your A-Zoom Micro to Power

10.01 Connecting A-Zoom Micro to power

Follow the diagram below to connect your A-Zoom Micro properly to wall power for the on-board LED illumination system: (See Fig. 7 below).

- A-Zoom μ Micro Microscope (incl.)
- LED Power Cord (incl.)
- Universal Transformer (incl.)
- Power Cord(s) (incl.)



BE SURE TO READ AND UNDERSTAND THE INTERCONNECT DIAGRAM SHOWN IN FIG. 7 BEFORE APPLYING POWER TO THE SYSTEM.

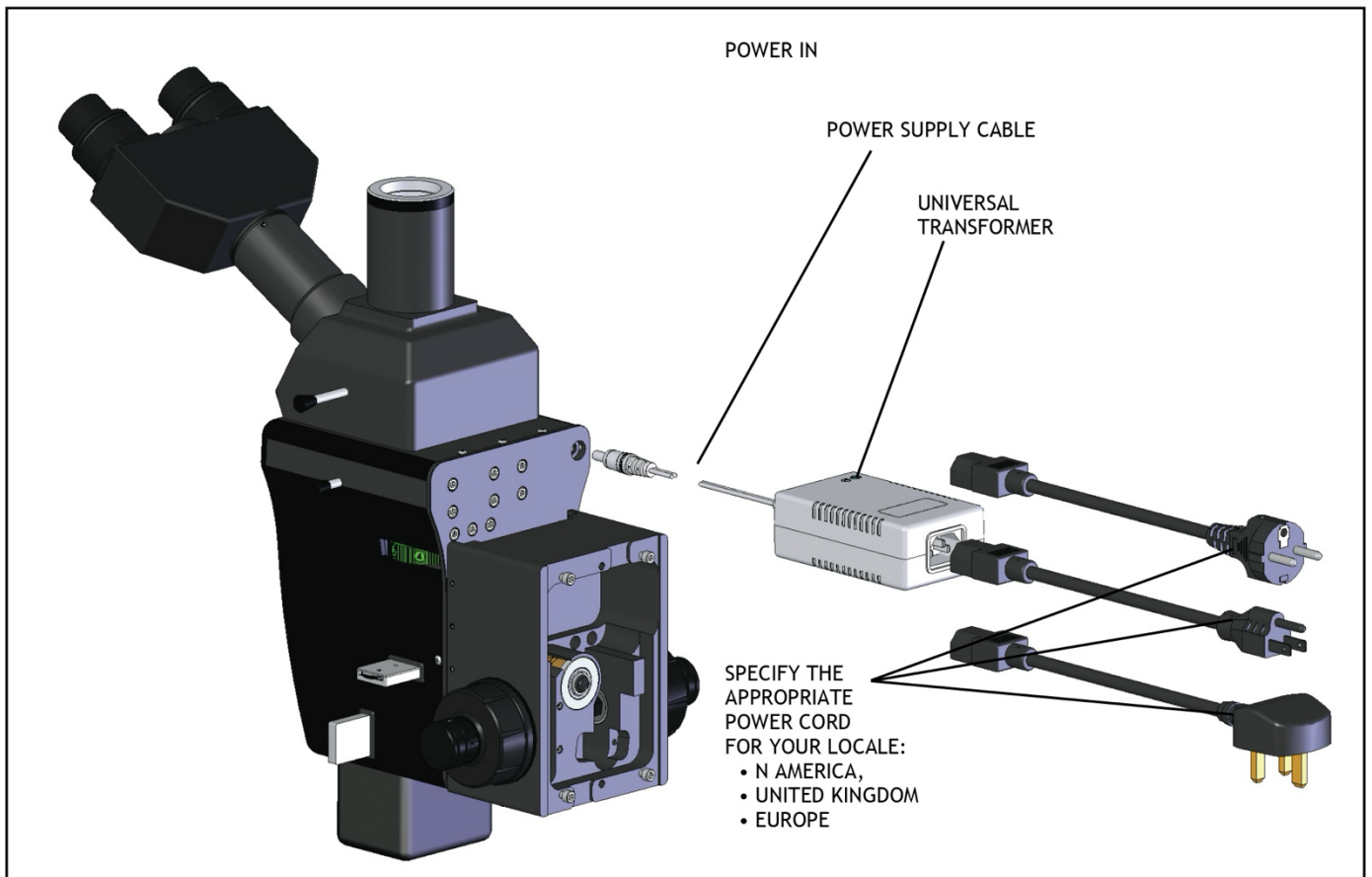


FIGURE 7

11.0 - Integrating Objectives

A-Zoom Micro is designed for optimal performance when used with Optem High-Resolution, Infinity-Corrected Objectives available from Excelitas, in 5X, 10X and 20X magnifications. Optem High-Resolution, Infinity-Corrected Objectives feature a 35mm O.D. barrel to fit most environmental chamber ports.



FIGURE 8

A-Zoom Micro comes standard with a convenient objective slider mount for quick and easy change out of objectives. The slider mount has M26x36T threads that will accept Optem Long-Working Distance Objectives, as well as alternative brand infinity-corrected objective (see Fig. 8).

11.01 Mounting Objectives

- 1) Thread objective into mount as shown (Fig. 9).
- 2) With the objective still loose adjust the screws in the front of the mount to visually center the retaining ring in the mount.
- 3) Once the retaining ring is centered, tighten the objective.
- 4) Place the objective in the A-Zoom Micro and confirm the centering

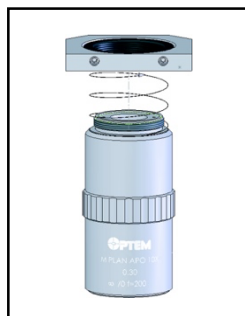


FIGURE 9

NOTE: The centering procedure may have to be performed with each objective change.

11.02 Optem High-Resolution LWD Objectives

Optem High-Resolution LWD Objectives offer a much higher numerical aperture and light gathering ability than other 5X, 10X and 20X objectives. Objectives sold separately.

Cat. No.	OPTEM® Objective	Numerical Aperture	Working Distance
28-20-44	5X High-Res Obj.	0.225	34mm
28-20-45	10X High-Res Obj.	0.45	19mm
28-20-46	20X High-Res Obj.	0.60	13mm

11.03 Optem M-Plan APO LWD Objectives

Optem M-Plan APO LWD Objectives provide exceptionally flat fields and precision color transmission across the entire field of view.

Cat. No.	OPTEM® Objective	Numerical Aperture	Working Distance
28-21-02-000	2X M-Plan APO Obj.	0.055	34mm
28-21-05-000	5X M-Plan APO Obj.	0.14	34mm
28-21-10-000	10X M-Plan APO Obj.	0.30	34mm
28-21-11-000	20X M-Plan APO Obj.	0.42	20mm
28-21-50-000	50X M-Plan APO Obj.	0.55	13mm

NOTE: Use of objectives other than Optem High-Resolution Objectives will result in reduced resolution performance from your A-Zoom Micro Microscope.

12.0 - A- Zoom Micro Head Options

12.01 Microscope Head Options

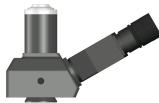
A-Zoom Micro is available with a variety of Head options to meet your viewing needs.

A-Zoom Micro HEAD AND EYEPIECE OPTIONS

58-01-00-000 ... Fixed Trinocular Head, 78mm eyepiece extender

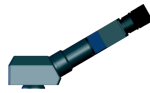
58-01-25-000 ... Fixed Trinocular Head, 130mm eyepiece extender

58-01-50-000 ... Fixed Trinocular Head, Widefield, 35mm eyepiece extender*



58-02-00-000 ... Fixed Binocular Head, 78mm eyepiece extender

58-02-25-000 ... Fixed Binocular Head, 130mm eyepiece extender



58-02-50-000 ... Fixed Binocular Head, Widefield, 35mm eyepiece extender

58-03-00-000 ... Tilting Trinocular Head, 127mm eyepiece extender

58-03-25-000 ... Tilting Binocular Head, 127mm eyepiece extender



58-03-50-000 ... Tilting Trinocular Head, Widefield, 127mm eyepiece extender*

58-03-75-000 ... Tilting Binocular Head, Widefield, 127mm eyepiece extender*



58-04-00-000 ... Camera port ONLY, 38mm ISO

* A-Zoom Micro Widefield heads recommend use with Optem camera Coupler DC67NN for optimal imaging



12.02 Changing out Microscope Heads

Using a 5/64" Allen (Hex head) wrench, loosen the microscope head locking screw through the small access hole located at the top center of the front main microscope body (fig. 11).



BEFORE LOOSENING THE HEAD LOCKING SCREW, PROPERLY SUPPORT THE MICROSCOPE HEAD TO ENSURE IT DOES NOT FALL FORWARD RESULTING IN DAMAGE OR INJURY.



FIGURE 11



SLOWLY TURNING COUNTER CLOCKWISE, LOOSEN THE LOCKING SCREW ONLY FAR ENOUGH SO THAT YOU CAN TILT THE MICROSCOPE HEAD AWAY FROM YOU SLIGHTLY AND FREELY ANGLE THE HEAD OUT OF THE RECEIVER PORT (FIG 12).

Do NOT over loosen the head locking screw, as it can fall into the microscope body.

To install the replacement microscope head, angle the head away from you slightly, lowering the dovetail mount under the locking tabs located toward the rear of the receiver port.

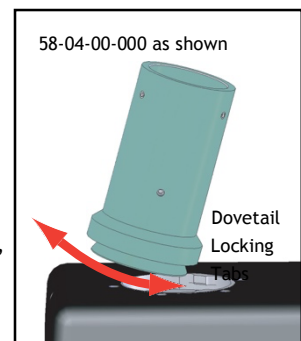


FIGURE 12

Continue to hold the microscope head. Re-insert the Allen wrench into the locking screw access port and tighten the screw carefully in a clockwise direction until the head is firmly seated.

12.03 Eyepieces

When your A-Zoom Micro is equipped with a 1/2-inch format camera, the Eyepiece fields-of-view match those of the monitor A-Zoom Micro comes with 22mm widefield, 10X Eyepieces featuring fully adjustable I.P.D. (inter-pupillary distance) and collapsible rubber eye guards.

12.04 Focusing and Adjusting Inter-Ocular Distance

There should be no adjustment required. If the system requires any adjustments, contact your local dealer or a technical representative from Excelitas

13.0 - Utilizing Polarizers with A-Zoom Micro

13.01 Polarizer Options

A-Zoom Micro offers linearly polarized light imaging. The Polarizer and Analyzer ports are located on the right side of the microscope body. By rotating the analyzer, the operator can highlight features of interest.

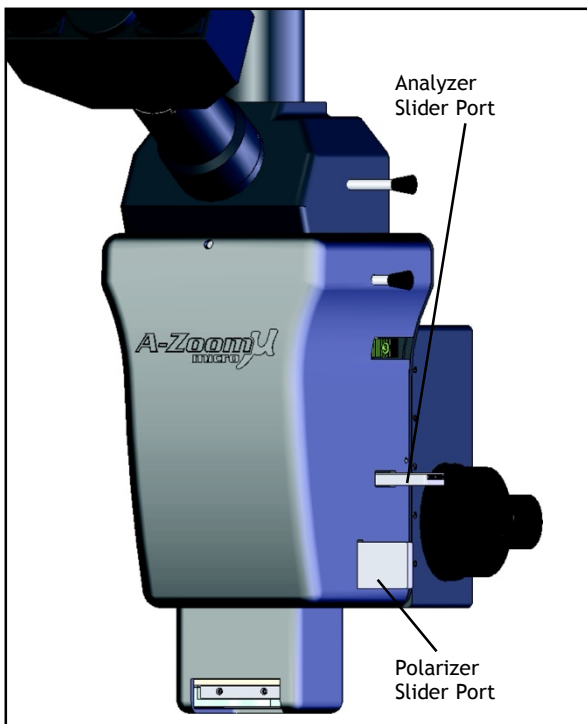


FIGURE 13

13.02 Installing Analyzer and Polarizer

Install the A-Zoom Micro Polarizer Slider (580100-313,) into the bottom vertical slider port as shown in Fig. 13. Install the Adjustable Analyzer Slider (580100-314) into the top horizontal port as shown in Fig. 13. NOTE: Ensure that the Analyzer slider is positioned with the adjustment dial closest to the top of the slider (Fig. 14).

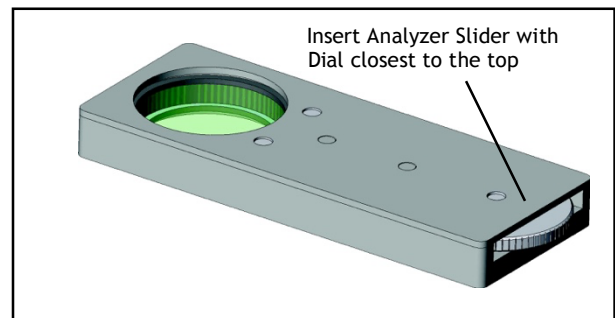


FIGURE 14

13.03 Adjusting Polarizers

With the Adjustable Analyzer Slider positioned above the Polarizer Slider, linearly polarized light is projected onto the specimen and reflected light then comes back through the objective and is imaged through the A-Zoom Micro.

The operator can rotate the Adjustable Analyzer to block out undesired light and highlight select features that change the polarization of the reflected light.

14.0 - Servicing & Technical Assistance

The A-Zoom Micro Analytical Probing Microscope is complex and intricate in design and assembly and should not be customer-altered or serviced. Contact your local sales representative or a Excelitas Sales Manager for all assistance in servicing your A-Zoom Micro Microscope.

14.01 Copies of This Manual

Hardcopy duplicates of this manual are available and can be requested from Excelitas. PDF versions of this manual are available for download from the Excelitas web site at www.excelitas.com.

15.0 - A-Zoom Micro Warranty Information

ONE YEAR WARRANTY

This product is warranted by Excelitas to be free from defects in material and workmanship for a period of one (1) year from the ship date at Excelitas. During this period Excelitas will repair or replace at the facility of Excelitas any part or assembly of parts found to be defective in material or workmanship subject to the following limitations and exclusions:

This warranty shall not apply to:

- Damage caused in transit.
- Product which has been damaged by misuse, abuse, or negligence
- Product showing signs of cover removal, tampering or any modifications made by others than the manufacturer.
- Lamps, lamp sockets, fuses, etc.
- Damage caused by improper or inappropriate installation.

It is expressly agreed that this warranty shall replace all warranties of fitness for any particular purpose and the warranty of merchantability. In no event, whether as a result of breach of contract or warranty, or alleged negligence, shall supplier be liable for direct, indirect, special or consequential damages including, but not limited to, loss of cost of capital, cost of substitute products, facilities, or services, downtime costs, or claims of customers, for such damage.



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