



# MANUAL

## EXC-500

### FLUORESCENCE MICROSCOPE SYSTEM





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## SAFETY NOTES

1. Open the shipping carton carefully to prevent any accessory, i.e. objectives or eyepieces, from dropping and being damaged.
2. Do not discard the molded Styrofoam container; the container should be retained should the microscope ever require reshipment.
3. Keep the instrument out of direct sunlight, high temperature or humidity, and dusty environments. Ensure the microscope is located on a smooth, level and firm surface.
4. If any specimen solutions or other liquids splash onto the stage, objective or any other component, disconnect the power cord immediately and wipe up the spillage. Otherwise, the instrument may be damaged.
5. **CAUTION:** the lamp, lamp housing and adjacent parts will become very hot. Do not touch these parts until they have completely cooled. Never attempt to handle a hot halogen bulb.
6. All electrical connectors (power cord) should be inserted into an electrical surge suppressor to prevent damage due to voltage fluctuations.
7. For safety when replacing the halogen lamp or fuse, be sure the main switch is off ("O"), remove the power cord, and replace the halogen bulb after the bulb and the lamp house has completely cooled.
8. Confirm that the input voltage indicated on your microscope corresponds to your line voltage. The use of a different input voltage other than indicated will cause severe damage to the microscope.

## CARE AND MAINTENANCE

1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.
2. Keep the instrument clean; remove dirt and debris regularly. Accumulated dirt on metal surfaces should be cleaned with a damp cloth. More persistent dirt should be removed using a mild soap solution. Do not use organic solvents for cleansing.
3. The outer surface of the optics should be inspected and cleaned periodically using an air stream from an air bulb. If dirt remains on the optical surface, use a soft cloth or cotton swab dampened with a lens cleaning solution (available at camera stores). All optical lenses should be swabbed using a circular motion. A small amount of absorbent cotton wound on the end of a tapered stick such as cotton swabs or Q-tips, makes a useful tool for cleaning recessed optical surfaces. Avoid using an excessive amount of solvents as this may cause problems with optical coatings or cemented optics or the flowing solvent may pick up grease making cleaning more difficult. Oil immersion objectives should be cleaned immediately after use by removing the oil with lens tissue or a clean, soft cloth.
4. Store the instrument in a cool, dry environment. Cover the microscope with the dust cover when not in use.
5. ACCU-SCOPE® microscopes are precision instruments which require periodic preventative maintenance to maintain proper performance and to compensate for normal wear. An annual schedule of preventative maintenance by qualified personnel is highly recommended. Your authorized ACCU-SCOPE® distributor can arrange for this service.

## INTRODUCTION

Congratulations on the purchase of your new ACCU-SCOPE<sup>®</sup> fluorescent microscope. ACCU-SCOPE<sup>®</sup> microscopes are engineered and manufactured to the highest quality standards. Your microscope will last a lifetime if used and maintained properly. ACCU-SCOPE<sup>®</sup> microscopes are carefully assembled, inspected and tested by our staff of trained technicians in our New York facility. Careful quality control procedures ensure each microscope is of the highest quality prior to shipment.

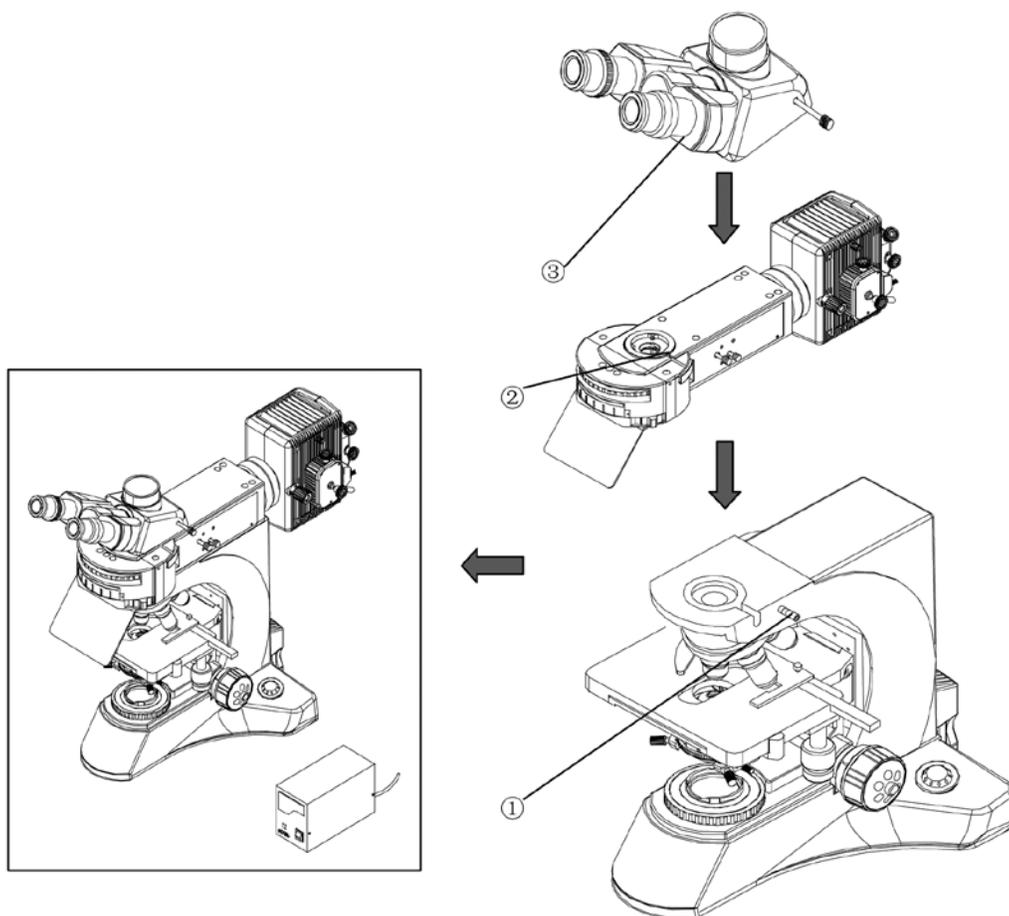
## UNPACKING AND COMPONENTS

Your microscope arrived packed in a molded Styrofoam container. ***Do not discard the container:*** the Styrofoam container should be retained for reshipment of your microscope if needed. Avoid placing the microscope in dusty surroundings or in high temperature or humid areas as mold and mildew will form. Carefully remove the microscope from the Styrofoam container by its arm and base and place the microscope on a flat, vibration-free surface.

## FLUORESCENCE ATTACHMENT ASSEMBLY

The diagram below shows how to assemble the various modules. The numbers indicate the order of assembly.

When assembling the microscope, make sure that all parts are free of dust and dirt, and avoid scratching any parts or touching glass surfaces.



- ① Loosen the set screw and remove the trinocular viewing head from the body of the microscope.
- ② Insert the Fluorescence attachment into the microscope and tighten the set screw until it is firmly in place.
- ③ Insert the viewing head into the Fluorescence attachment as shown and tighten the set screw until it is firmly in place.

## ASSEMBLY

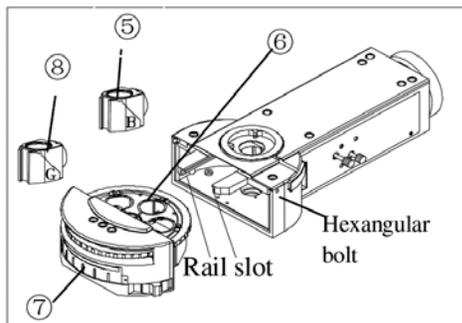


Fig. 1

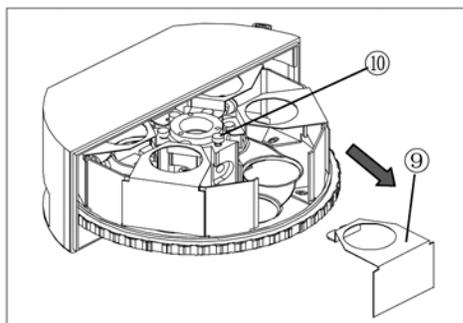


Fig. 2

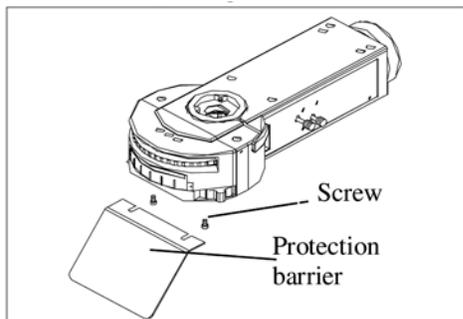


Fig. 3

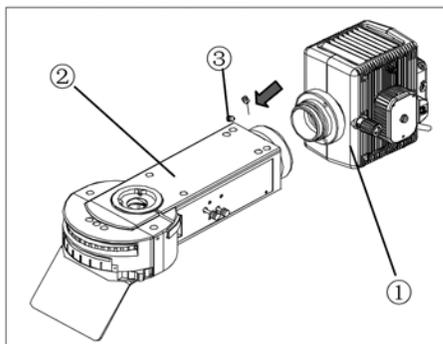


Fig. 4

### Mounting Filter Blocks (Fig. 1 and Fig. 2)

Unscrew the Allen screws with the included Allen wrench and take out the filter block turret (6).

**NOTE:** If your microscope was ordered with filters, they have been pre-installed, so you may skip this step.

Invert the filter block turret (6), (several model blocks (9) can be found.) Loosen the Allen screw (10) to take one of the blocks out.

Mount a filter cube (8) (Fig. 3) into the top of the model block and tighten the screw (10). Beside the screw, you can see a number on the turret indicating G-excitation. To help identify mirror blocks, place a label below the corresponding number on the front side of the mirror turret. Repeat procedure to mount other blocks.

Push the filter block turret back into the rail slot and tighten the Allen screw.

### Mounting Protection Barrier (Fig. 3)

Install the protection barrier on the attachment by tightening the screws.

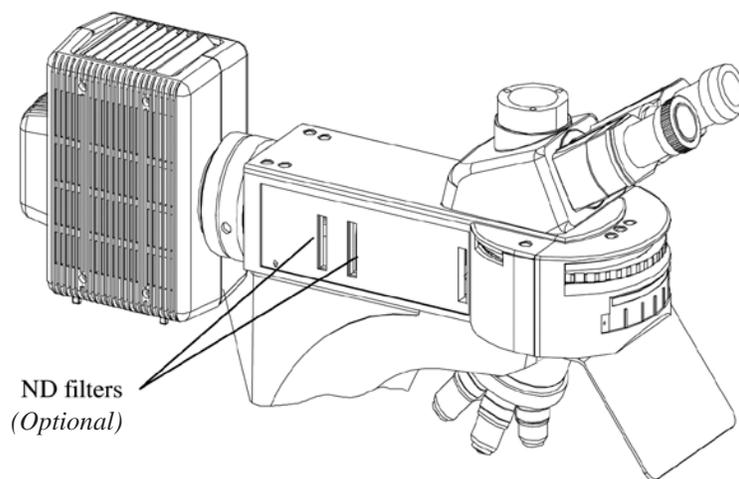
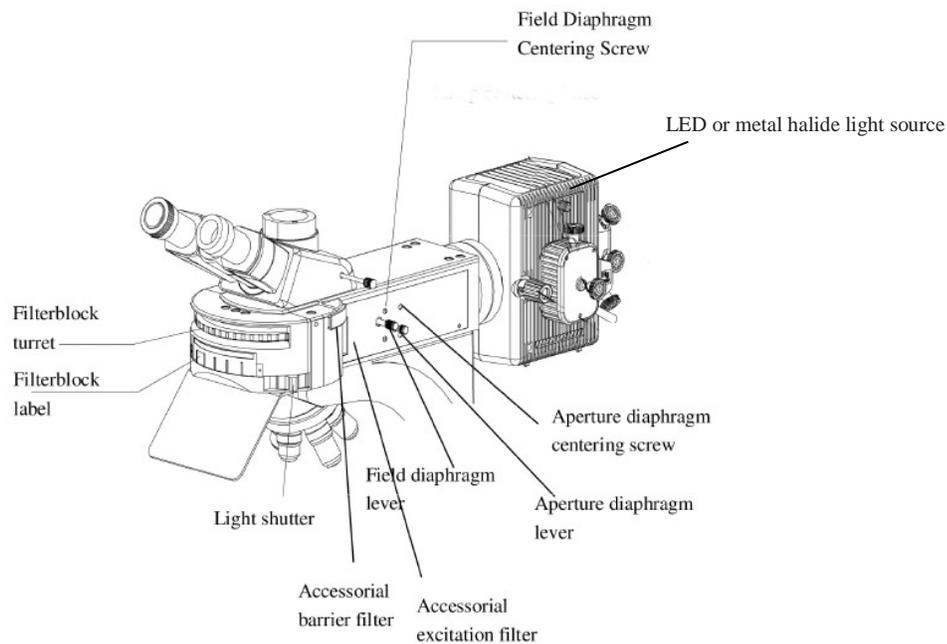
### Assembly of the Fluorescent Attachment (Fig. 4)

Mount the lamp housing (1) into the other end of the attachment (2) and secure it with two screws (3).

**NOTE:** LED or metal halide illuminators will look differently from the photo.

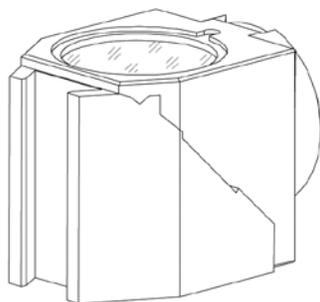
## ADJUSTMENT & OPERATION

### Components Diagrams



## ADJUSTMENT & OPERATION - *continued*

Fluorescent mirror block (filter block )



**Fig. 5**

### **Adjusting the Rotation Tension of the Fluorescent Mirror Block (Filter Block)**

There are 6 fluorescent mirror block positions (filter blocks) in the filter block turret. (Fig. 5).

A mirror block includes a dichroic mirror, a barrier filter, and an excitation filter. Do not take apart the filter block.

A wide variety of filter sets are available. Please consult with your ACCU-SCOPE distributor to select the appropriate set for your application.

### **Preparation**

Verify that the voltage and the frequency of the AC main outlet match the setting of the voltage switch and the frequency switch on the rear of the power supply unit.

Make sure the cord is connected firmly.

When transmitted light observation is required, pull out the filter system and rotate the blank opening into the light path.

Adjust the field diaphragm to match the field edge. If it is not centered, use the Allen wrench to adjust the screw.

When it is required to interrupt observation for a short period, use the shutter mechanism on the filter wheel to block the light accessorial excitation filter part.

Precautions on the specimen color fading:

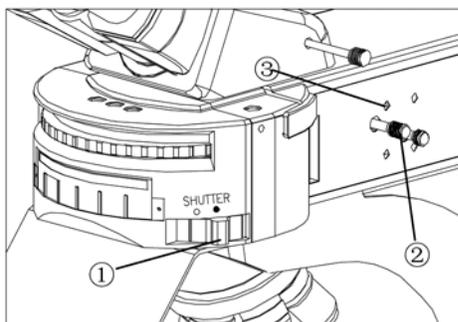
The system employs high-intensity excitation light to enable bright observation of dark fluorescence specimens. As a result, if high-power objectives are used frequently, color fading of the specimen occurs early, degrading the view (contrast) of fluorescence images. So it is effective to use the shutter frequently to avoid illuminating the specimen for a longer period than required.

A ND (neutral density) filter and small aperture diaphragm can help weaken the intensity of the excitation light. Also, it is useful to use the light shutter to reduce the specimen color fading.

Color fading of the specimen can also be delayed using commercially available color fading preventing agent (DABCO, etc). The use of color fading preventing agent is recommended when you perform high-magnification observation frequently.

**NOTE:** color fading preventing agent cannot be used with certain specimens

## OPERATION - continued



**Fig. 1**

### Centering the Field Iris Diaphragm (Fig.1)

Switch the light shutter ① to “●” closed position.

Turn filter block turret to engage the B-excitation mirror in the light path.

Switch the light shutter ① to “O” open position. Rotate the 10x objective in the light path, and place the specimen on the stage and bring into approximate focus.

Pull the field iris diaphragm lever ② out until the diaphragm comes into the smallest state.

Use the Allen wrench to adjust the two field iris diaphragm centering screws alternately to move the image of the diaphragm to the center. (Fig. 2 shows the adjustment of diaphragm)

Move the field diaphragm lever to open the diaphragm. As this makes slight deviation noticeable, adjust the centering precisely.

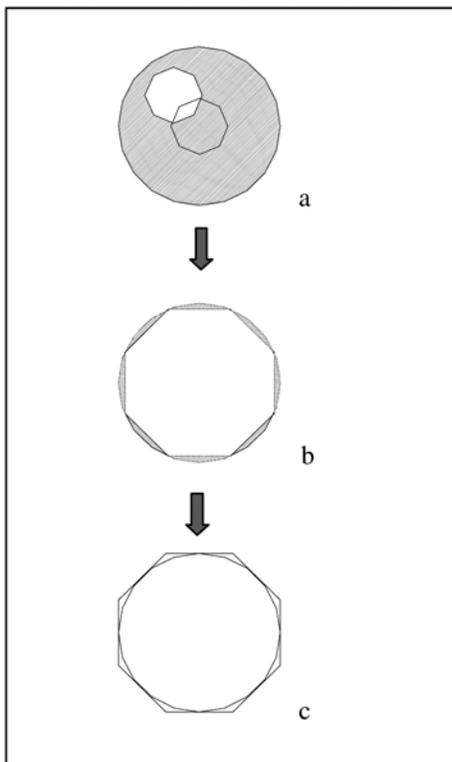
Enlarge the diaphragm until it just circumscribes the field of view.

### Adjusting the Field Iris Diaphragm (Fig. 2)

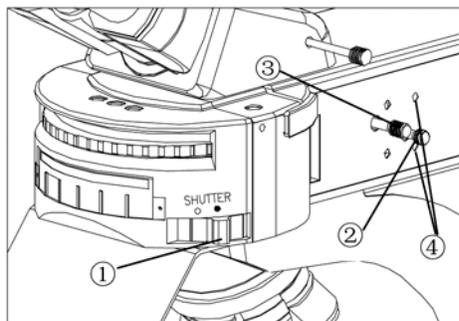
The field diaphragm adjusts the diameter of the illuminating beam to obtain good image contrast.

Keeping the field diaphragm stopped down to the smallest required area for each observation makes it possible to prevent color fading of areas outside the observation target region.

According to the objective in use, adjust the diaphragm image using the field diaphragm lever so that the field of view is circumscribed by the field diaphragm to exclude stray light.



**Fig. 2**



**Fig. 3**

## Centering the Aperture Iris Diaphragm (Fig. 3)

Switch the light shutter ① to “●” close position to turn off the light path.

Rotate the filter block turret to engage the G-excitation mirror block or another into the light path.

Switch the light shutter ① to “O” open position to open the light path.

Rotate the 10x objective in the light path, and place the centering plate (a white plate with a cross) on the stage and bring into approximate focus.

Move the cross of the centering plate to the center of the field of view.

Pull out the aperture diaphragm lever ② to adjust the aperture iris diaphragm to the smallest diameter.

Pull out the field iris diaphragm lever ③ to adjust the field iris diaphragm to the smallest diameter. The image of aperture iris diaphragm can be found on the centering plate.

Adjust the aperture iris diaphragm centering screws ④ with attached wrench to superpose the image of aperture iris diaphragm on the cross of centering plate.

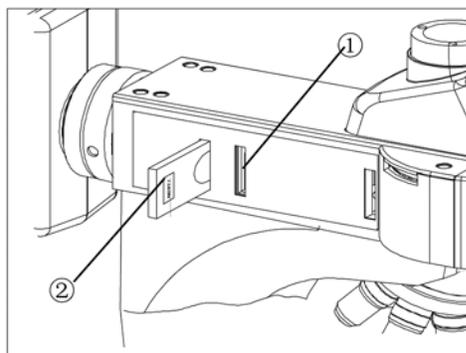
## Adjusting the Aperture Iris Diaphragm (Fig. 3)

The aperture iris diaphragm adjusts image resolution and contrast.

For fluorescence observation, push in the aperture iris diaphragm lever ③.

Both ND (neutral density) filter and small aperture diaphragm can help weaken the intensity of the excitation light to delay color fading of the specimen

According to the objective in use, adjust the diaphragm image using the field iris diaphragm lever ③ so that the field of view is circumscribed by the field iris diaphragm to exclude stray light.



**Fig. 4**

## Mounting the ND (Neutral Density) Filter (Fig. 4)

The ND filter can reduce the excitation light intensity to delay color fading of the specimen. Use the ND filter if it does not hinder observation.

There are two kinds of ND filters available: ND6 and ND25 for position ① and ② respectively (Fig. 4). To prevent the ND filter from being damaged, insert the filter with the indication surface facing the observation side.

When the filter is inserted, you will hear two clicks. The filter is in the light path on the second click.

### **CAUTION**

When the mercury lamp is lit for a long period while an ND filter is inserted, the filter and its metallic frame may become very hot. Wait until the ND filter cools down before replacing it.

## TROUBLESHOOTING

Under certain conditions, performance of this unit may be adversely affected by factors other than defects. If a problem occurs, please review the following list and take remedial action as needed. If you cannot solve the problem after checking the entire list, please contact your local dealer for assistance.

### Optics

PROBLEM	CAUSE	SOLUTION
Visibility is poor. Image is not sharp. Contrast is poor.	The objective or filter is dirty	Clean them thoroughly
	The aperture iris diaphragm and field iris diaphragm are adjusted improperly	Open these iris diaphragms fully
	The fluorescence mirror block is not proper for the specimen	Use proper mirror block
The edge of the field of view is obscured or not evenly illuminated	The objective is improperly engaged in the light path	Make sure the nosepiece clicks properly into place
	The fluorescence mirror block is improperly engaged in the light path	Engage it properly in the light path
	The field of view doesn't open fully	Open it fully
	ND filter is stopped in halfway in the light path	Pull in the filter slider until it clicks into place
	The mercury lamp is not centered.	Center it
	The collector focus position is not correct	Adjust it to an optimum position
Shadow exists in the field of view	The burner or collector is dusty or stained	Clean them thoroughly

### Electrical System

The main switch cannot supply power to the system	The power cord is connected improperly	Connect it properly
	A fuse is blown	Replace the fuses
The main switch can be set to ON but the burner doesn't ignite	The lamp housing connecting cord is connected improperly	Connect it properly to the connectors
	The mercury lamp is not mounted	Attach a mercury lamp
	The auto ignition system is malfunctioning	Set the main switch of the power supply unit to OFF then on again. (Repeated ON-OFF is possible in this case)
The mercury lamp flickers or the brightness is low	The phenomenon is observed in a short period after ignition	Wait for 10 minutes or more after ignition
	The lamp life has expired	Replace the mercury lamp

## MAINTENANCE

Please remember to **never** leave the microscope with any of the objectives or eyepieces removed and always protect the microscope with the dust cover when not in use.

## SERVICE

ACCU-SCOPE® microscopes are precision instruments which require periodic servicing to keep them performing properly and to compensate for normal wear. A regular schedule of preventative maintenance by qualified personnel is highly recommended. Your authorized ACCU-SCOPE® distributor can arrange for this service. Should unexpected problems be experienced with your instrument, proceed as follows:

1. Contact the ACCU-SCOPE® distributor from whom you purchased the microscope. Some problems can be resolved simply over the telephone.
2. If it is determined that the microscope should be returned to your ACCU-SCOPE® distributor or to ACCU-SCOPE® for warranty repair, pack the instrument in its original Styrofoam shipping carton. If you no longer have this carton, pack the microscope in a crush-resistant carton with a minimum of three inches of a shock absorbing material surrounding it to prevent in-transit damage. The microscope should be wrapped in a plastic bag to prevent Styrofoam dust from damaging the microscope. Always ship the microscope in an upright position; **NEVER SHIP A MICROSCOPE ON ITS SIDE**. The microscope or component should be shipped prepaid and insured.

### LIMITED MICROSCOPE WARRANTY

This microscope is warranted to be free from defects in material and workmanship for a period of five years from the date of invoice to the original (end user) purchaser. The mercury power supply is warranted for a period of one year from the date of invoice to the original (end user) purchaser. This warranty does not cover damage caused in-transit, misuse, neglect, abuse or damage resulting from improper servicing or modification by other than ACCU-SCOPE approved service personnel. This warranty does not cover any routine maintenance work or any other work, which is reasonably expected to be performed by the purchaser. Normal wear is excluded from this warranty. No responsibility is assumed for unsatisfactory operating performance due to environmental conditions such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage or other conditions beyond the control of ACCU-SCOPE INC. This warranty expressly excludes any liability by ACCU-SCOPE INC. for consequential loss or damage on any grounds, such as (but not limited to) the non-availability to the End User of the product(s) under warranty or the need to repair work processes. Should any defect in material, workmanship or electronic component occur under this warranty contact your ACCU-SCOPE distributor or ACCU-SCOPE at (631) 864-1000. This warranty is limited to the continental United States of America. All items returned for warranty repair must be sent freight prepaid and insured to ACCU-SCOPE INC., 73 Mall Drive, Commack, NY 11725 – USA. All warranty repairs will be returned freight prepaid to any destination within the continental United States of America, for all foreign warranty repairs return freight charges are the responsibility of the individual/company who returned the merchandise for repair.

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