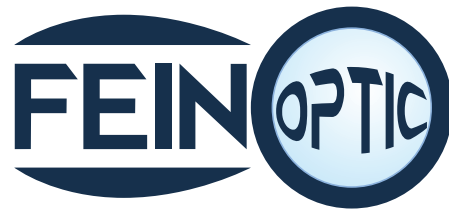


# IRB70 Inverted Microscope User's Manual

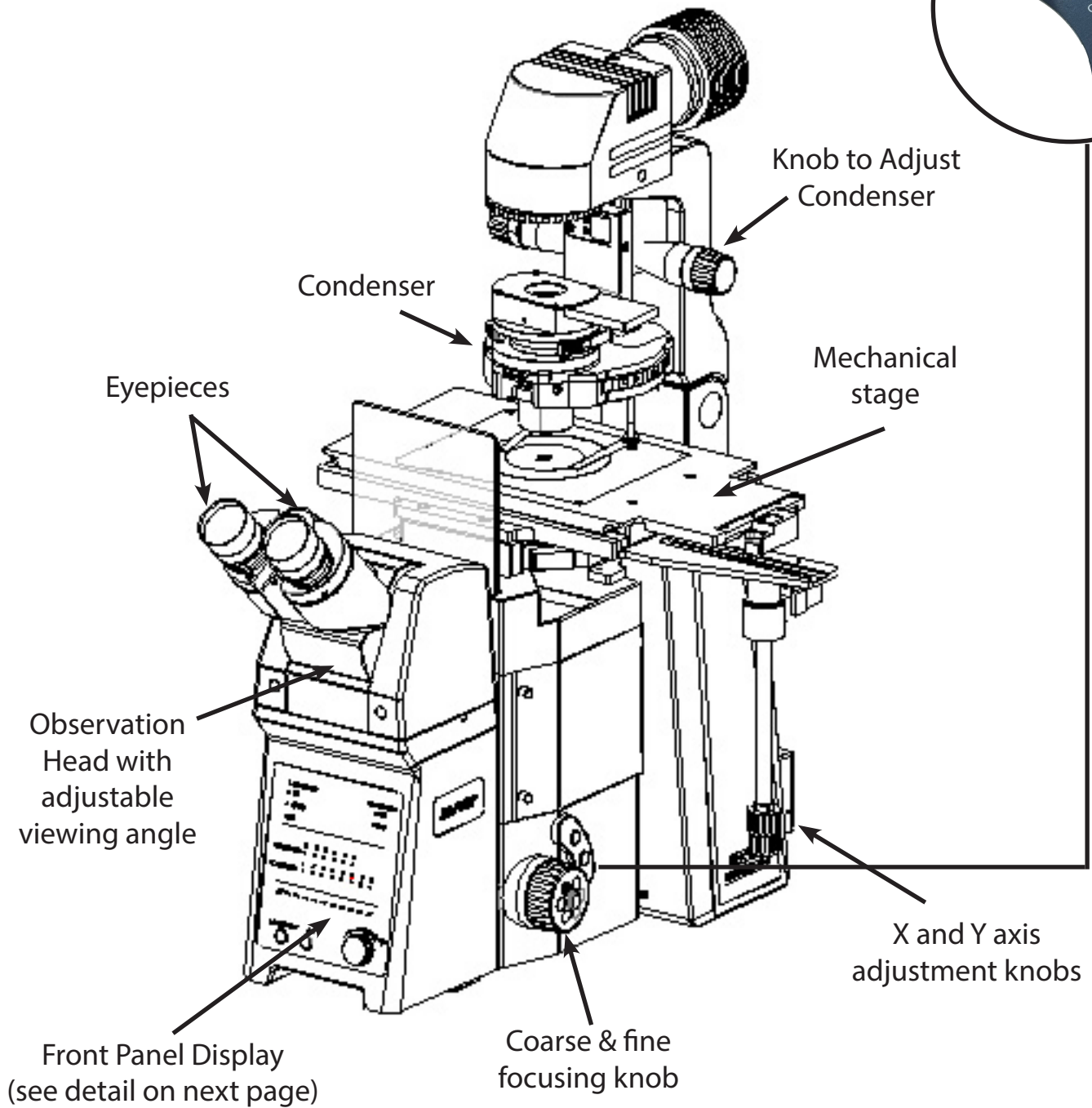
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# IRB70 Microscope Components

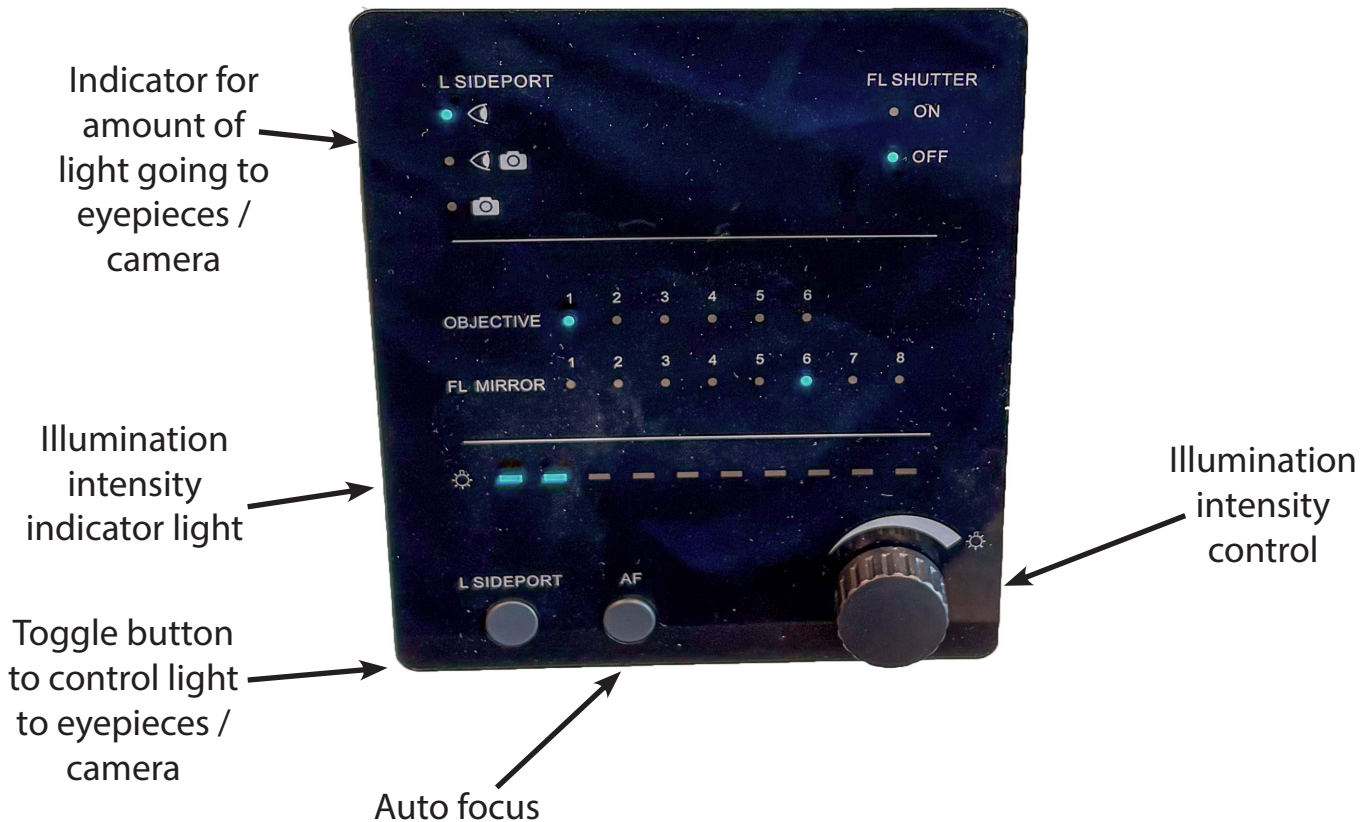
Button to switch between objectives in clockwise or counterclockwise direction



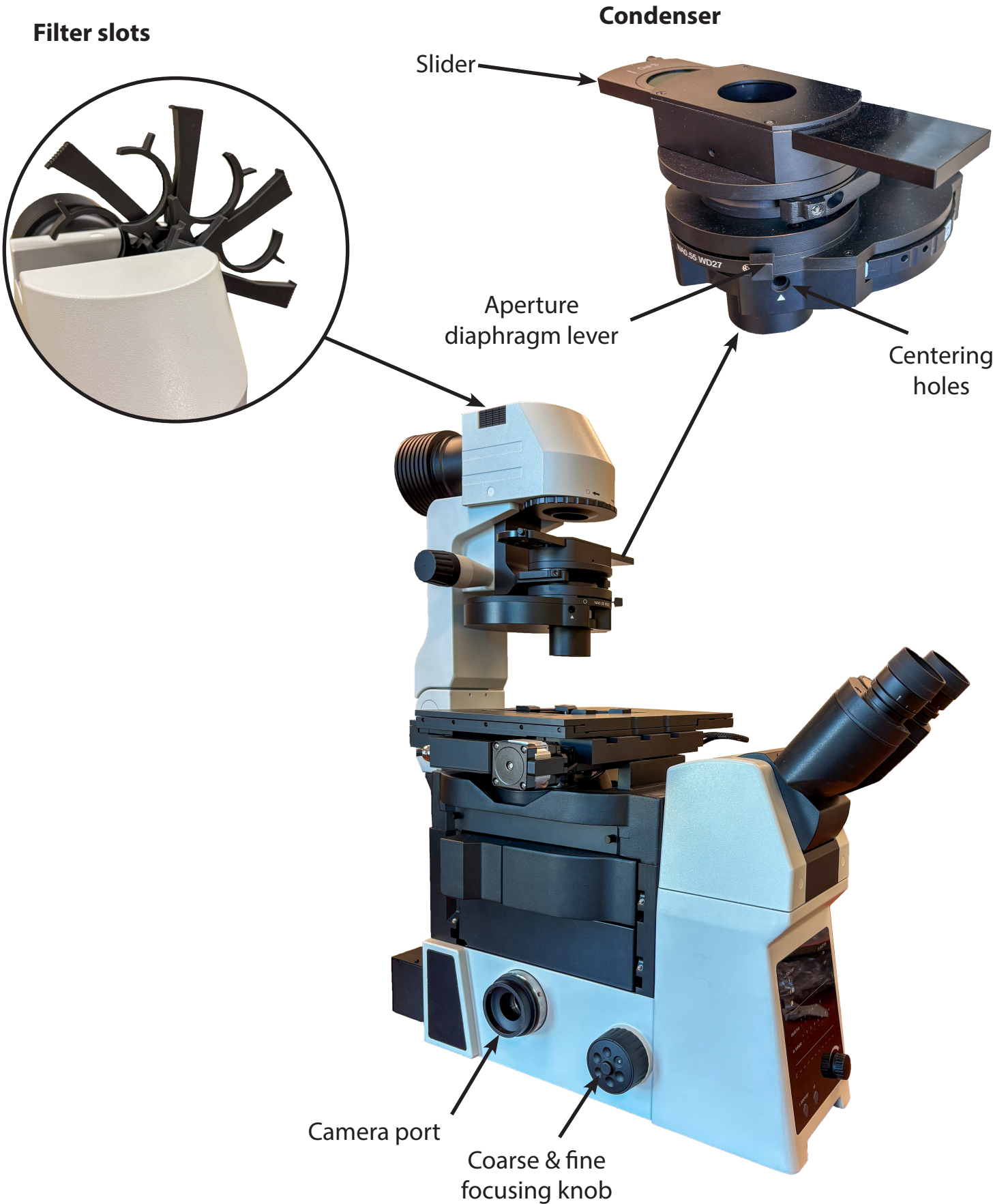
## Power Box



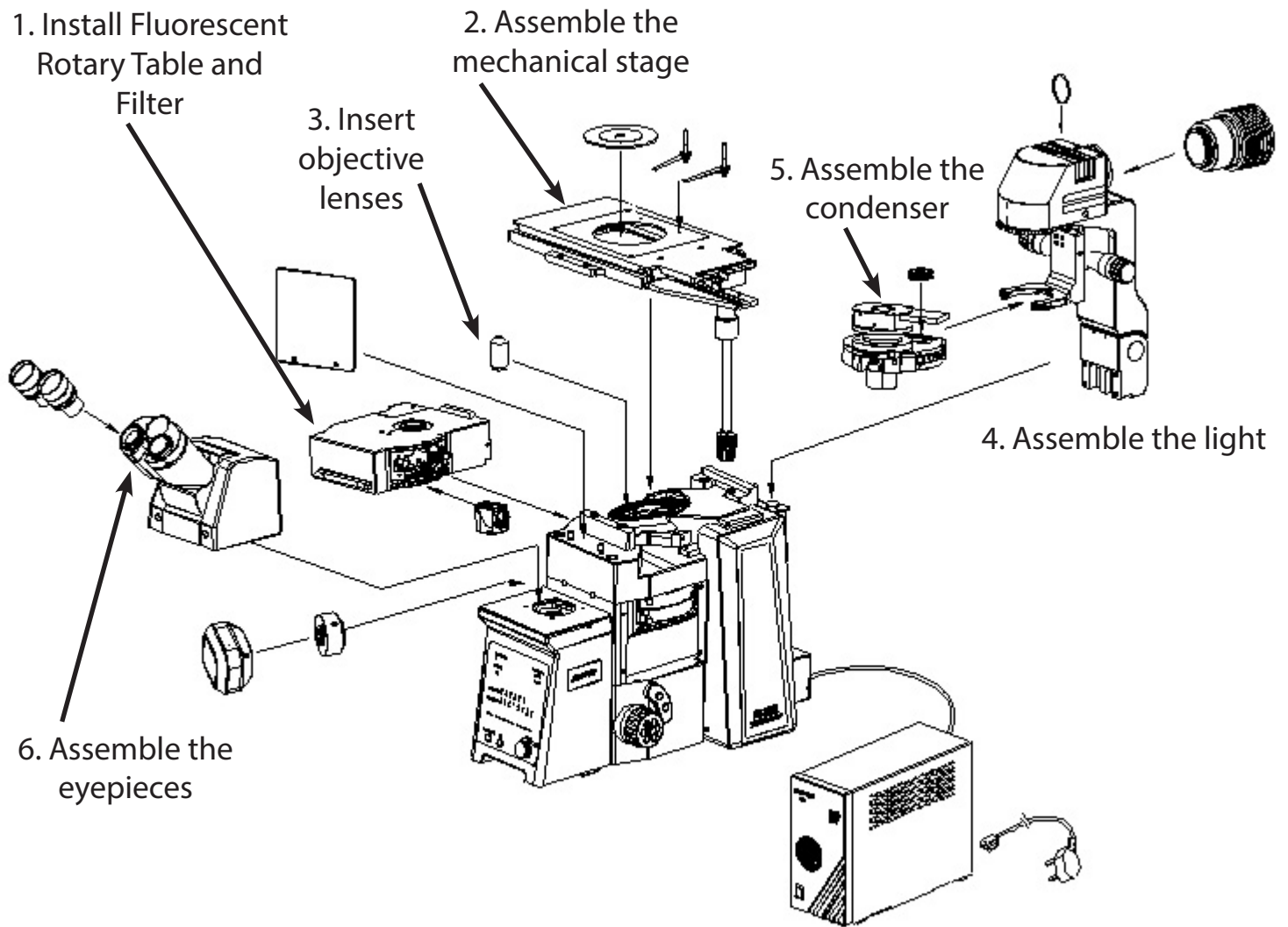
## Front Display Panel



# IRB70 Microscope Components



# IRB70 Microscope Assembly Overview

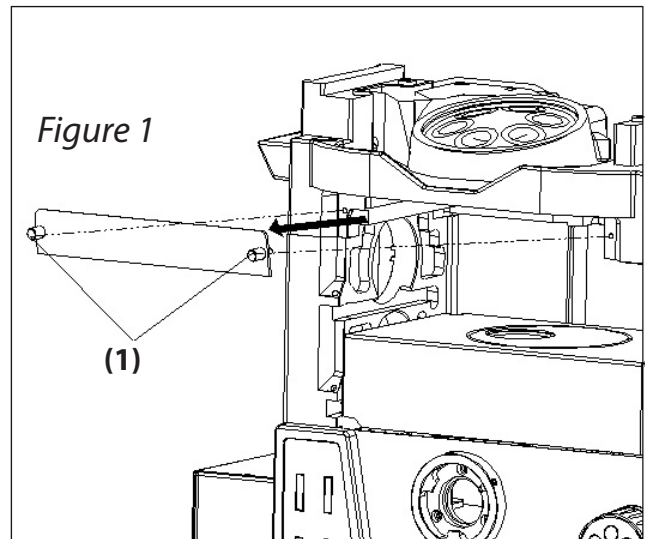


Refer to the following pages for detailed information on assembling each component of the microscope.

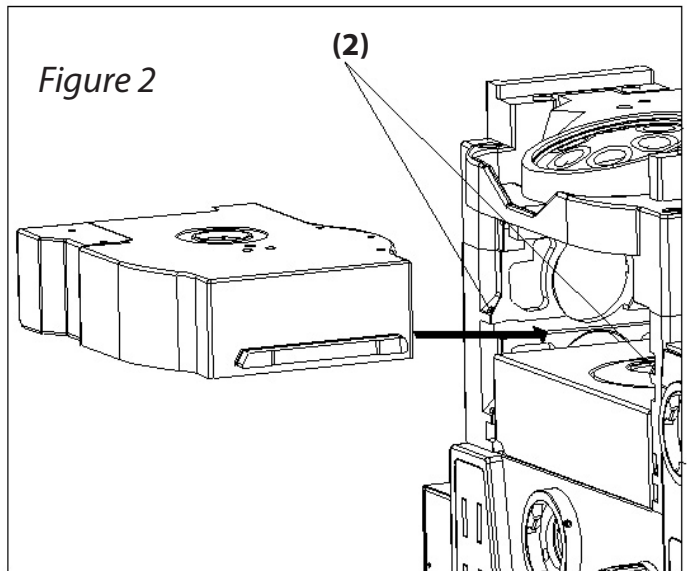
# IRB70 Microscope Fluorescent Cube Assembly



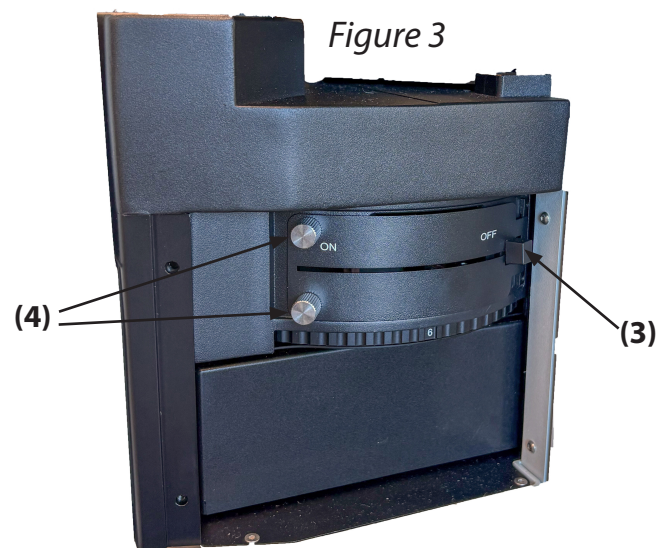
To assemble the Fluorescent Rotary Table, first unscrew the two fixing screws (1) and remove the left side plate as shown in Figure 1.



Unscrew the fixing screws (2) with the included hex key wrench. Gently push the Fluorescent Rotary Table into the slot as shown in Figure 2. Retighten the fixing screws (2) with the hex key wrench. Reinstall the left side plate and retighten the screws removed in the previous step (see Figure 1).



To install or replace the fluorescent filter, toggle the switch (3) to the off position (refer to Figure 3). Unscrew the two screws (4) by hand. Remove the cover plate.





Push the filter cube (5) into the Fluorescent Rotary table until you hear a click (see Figure 4). The Fluorescent Rotary table has a number (6) on each position, which corresponds to the hole number where the filter is installed. Note the position number and type of filter installed for future reference. If more than one filter needs to be installed, rotate the dial on the bottom of the Fluorescent Rotary table and install the next filter, taking note of its type and position. After all filters are in place, replace the cover removed in the last step on the previous page and replace and retighten the screws to secure the cover in place.

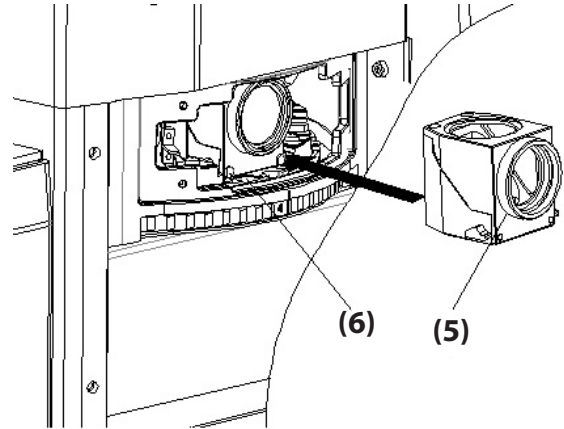


Figure 4



Carefully connect the interface cable between the Fluorescent Rotary Table and the spot shown in Figure 5. Use a gentle touch when twisting or winding the power cord as it is easily damaged.

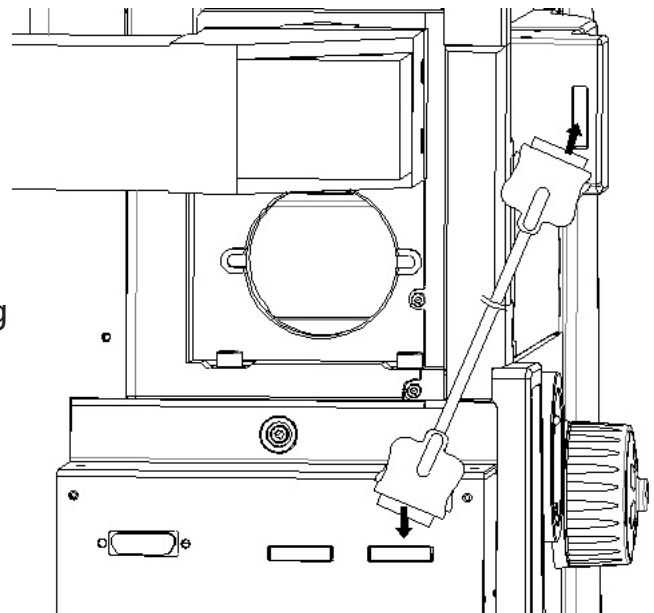


Figure 5



Refer to Figure 6 for reference. **Note: the mechanical stage requires 2 people to assemble due to its large size.** Align the 4 screw holes (1) on the stage (2) with the 4 holes on the microscope base. Using the included M5 Allen wrench, screw in the 4 screws (3) to secure the stage to the base. Using the M4 Allen wrench, loosen and remove the screws (4) on the side of the platform.

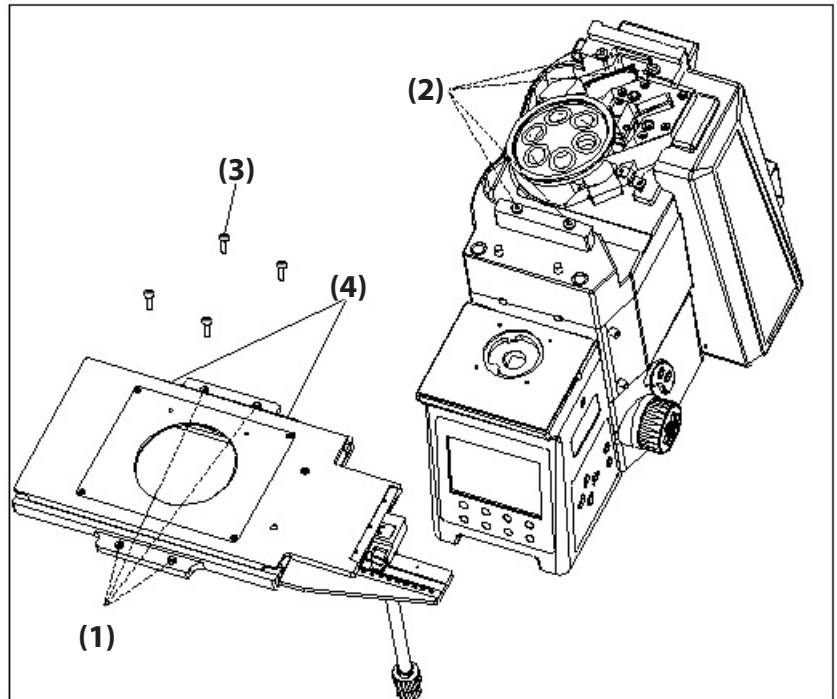


Figure 6



Carefully screw the threaded end of each objective into the holes on the microscope nosepiece as shown in Figure 7. **Note: Use the objective rotation button shown on the first page of this manual to change the nosepiece position from one objective hole to the next. Do not turn the nosepiece manually.** Install the objectives from lowest to highest magnification in a clockwise direction from hole #1 to #7. Install a dustcover in any empty position to prevent dust and dirt from entering the system.

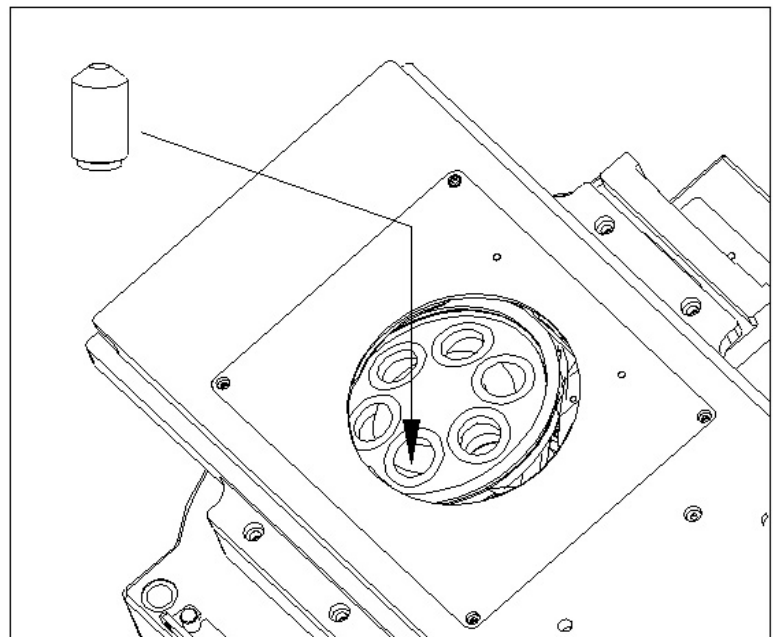


Figure 7





Refer to Figure 8 when completing this step. **Note that this assembly step requires two people.** To assemble the light, first, align the u-shaped groove on the bottom of the light assembly (2) with the pin on the side of the microscope base (1). Once the pin is aligned, use the included M5 Allen wrench to tighten the screws (4) into the appropriate holes (3) on the base.

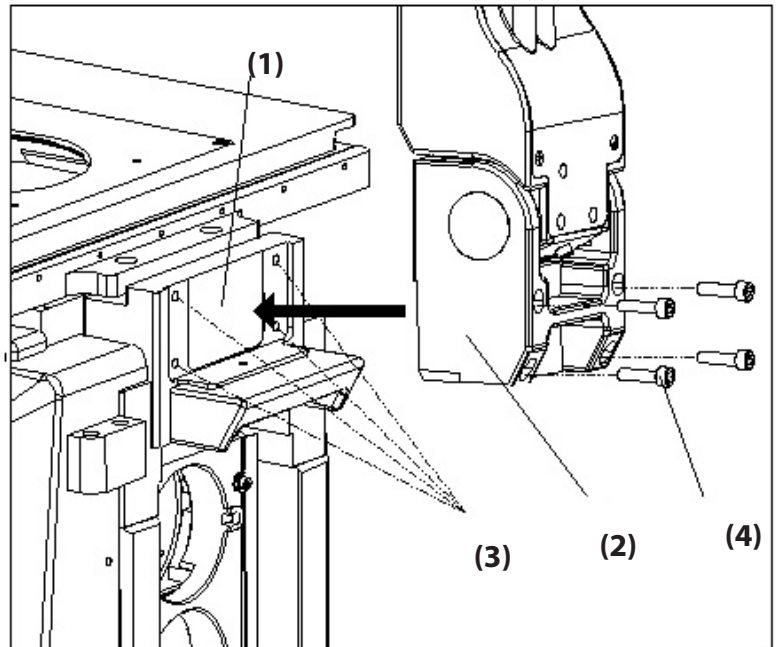


Figure 8



Refer to Figure 9 for reference. To assemble the condenser, first turn the knob (1) to lower the condenser bracket to a height where the condenser does not hit any other part of the microscope during assembly. Use the included M4 Allen key to unscrew the set screw (2). Align the groove (3) on the condenser with the u-shaped groove (4) on the condenser lens and gently push it into the bracket as far as it will go. Secure the condenser in place by tightening the set screw (2).

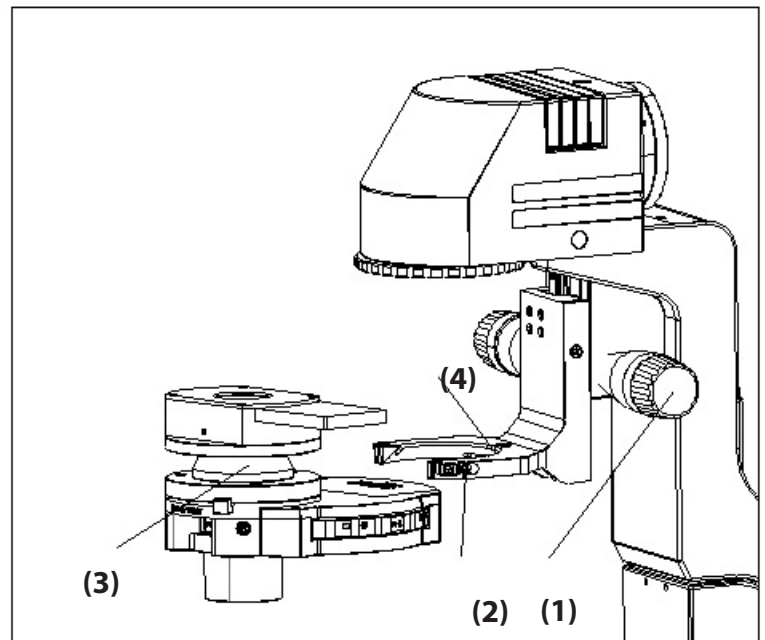


Figure 9



Refer to Figure 10. To assemble the light, first orient the lamp base (1) horizontally and gently push it all of the way into the slot (2) at the back of the microscope. Tighten the fastening screws (3) to secure the lamp in place.

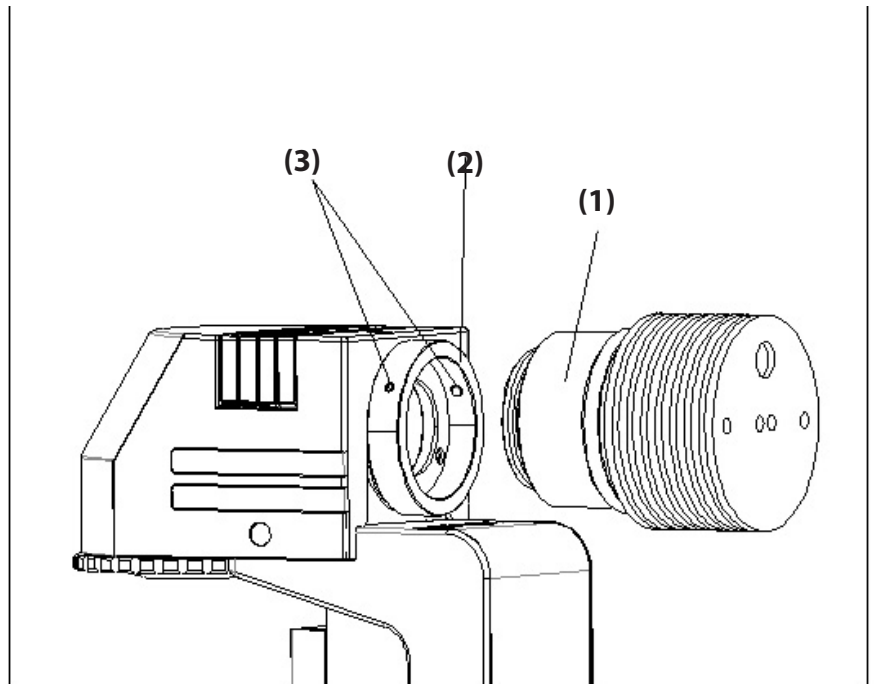


Figure 10



If desired, filters may be inserted in the light path. There are 4 separate positions for mounting filters on the top of the microscope. (For an image of the whole microscope, refer to the picture on page 3.) To install a filter, open (pull up) a filter holder on the top of the microscope (see Figure 11), and insert the desired filter. Gently push down to put the filter back in place. Be careful not to touch the filter lens with your fingers. If a filter does get dirty with fingerprints or dust, use a Kimwipe or similar gentle cloth to clean. Note that when using a ground glass filter, the ground surface of the filter needs to face the light source.

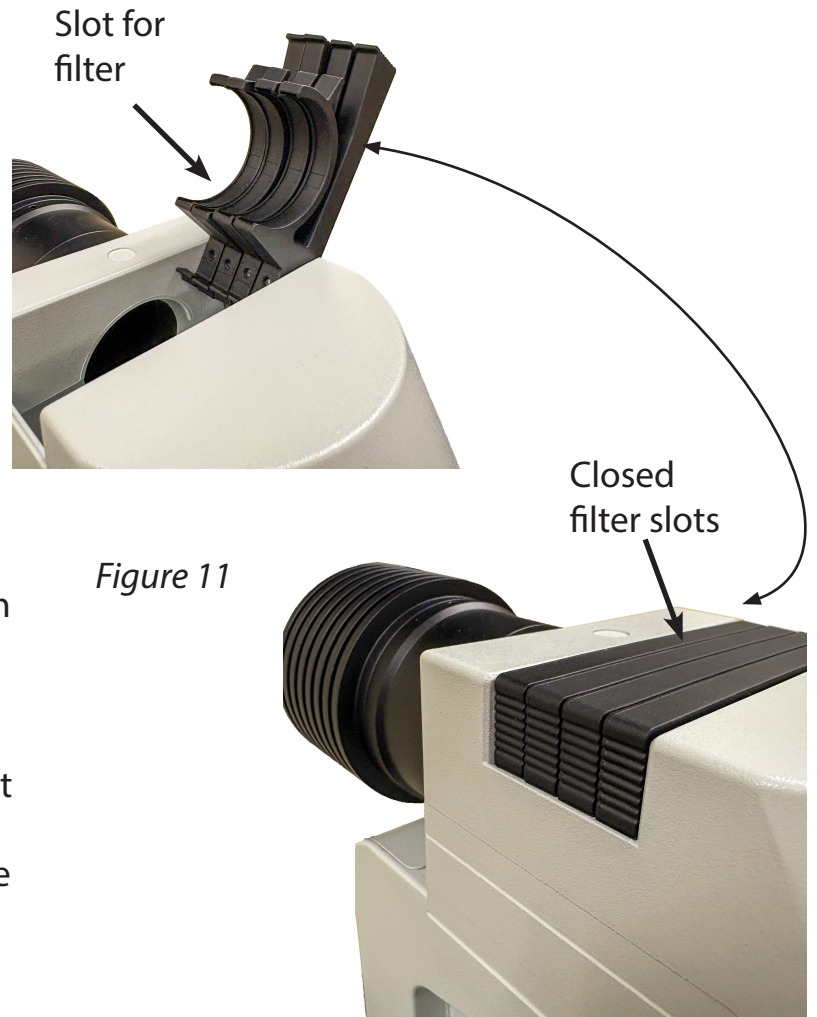


Figure 11



Refer to Figure 12 for reference. To attach the head to the microscope, first fully loosen the set screw (1). With the eyetubes on the head facing forward as shown in Figure 10, align the bottom of the head assembly with the hole on the microscope body. Tighten the set screw (1) to secure the microscope head in place.

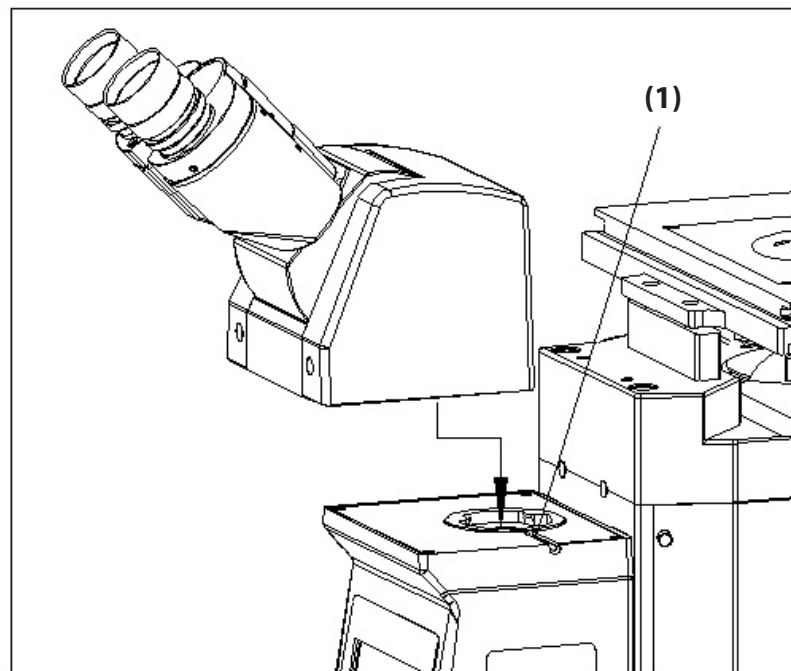


Figure 12



Refer to Figure 13 when assembling the eyepieces. Remove the plastic covers from the eyepieces (1). Insert an eyepiece (2) into each eyepiece tube (3), making sure to gently push it in as far as it can go.

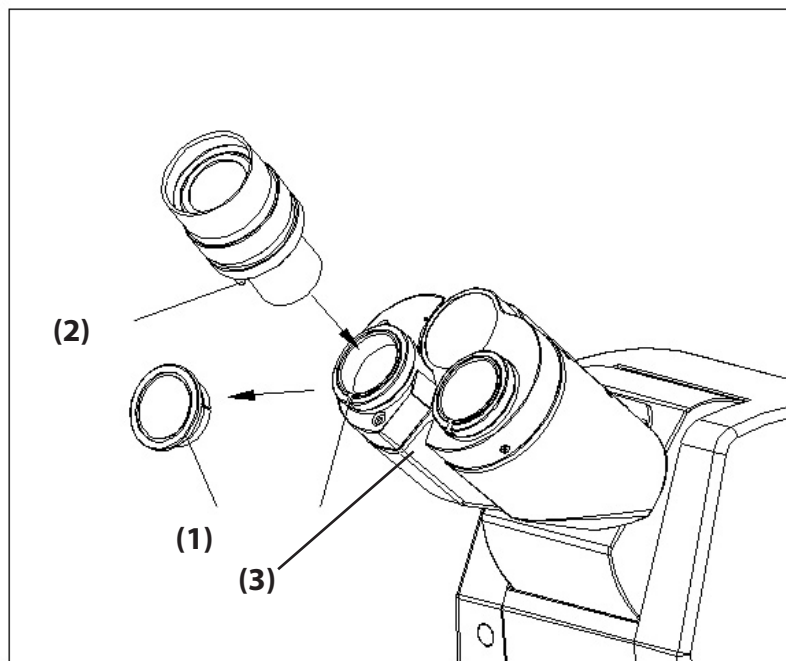


Figure 13

# IRB70 Power Connection



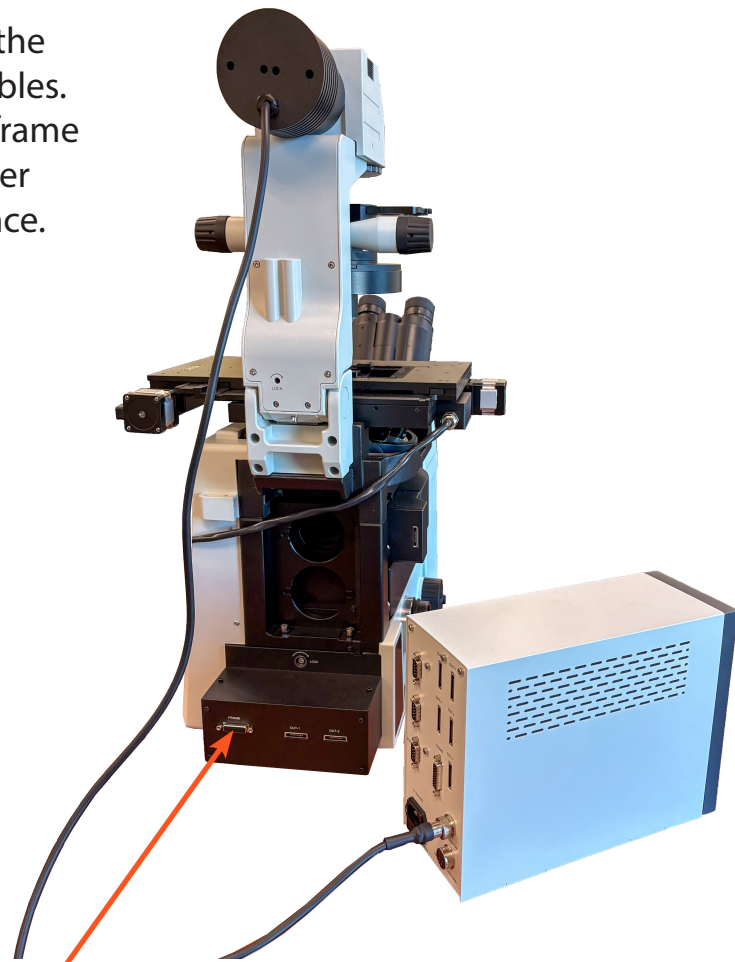
Make sure that the main power box is in the off (O) position before connecting the cables. Connect the cable from the microscope frame and from the light source(s) to main power using the images on this page for reference.

## Power source (front)



Main power on/ off switch

## Power source (back)



Attach cable from the leftmost slot on the back of the microscope frame and plug the opposite end into the slot labeled "frame".

Attach cable from top light source here.

If fluorescence it used, light source attaches here.

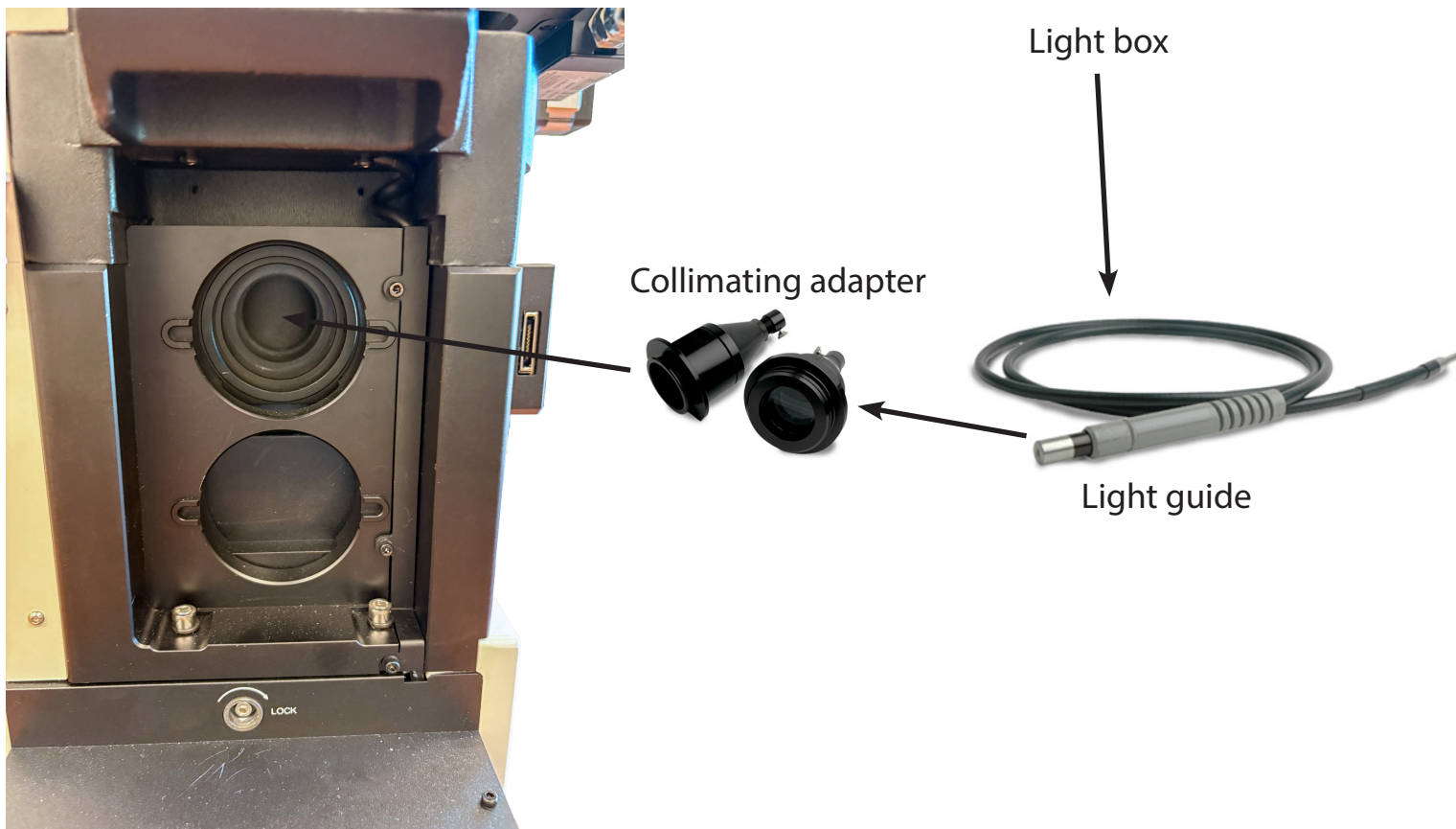
Plug cable from main power source to wall power here.

## IRB70 Fluorescence Light Box Connection



To attach the microscope to the (optional) fluorescent light box, first connect the light guide to the light box and then to the collimating adapter. Attach the collimating adapter to the back of the microscope frame as show in the images below. Plug in the light box power supply to the appropriate location on back of the main microscope power source as shown on the previous page (page 11).

### Back of microscope



When all connections have been made, turn on the main power before proceeding to the next step.



## Setting the Lighting Level

(Figure 14)

First, turn the main power (1) on ("I" position). Adjust the lighting level using the adjustment knob (2). Rotating the knob clockwise will increase the light intensity, while rotating the knob counterclockwise will decrease the light intensity. The chosen light intensity is indicated on the front panel (3).

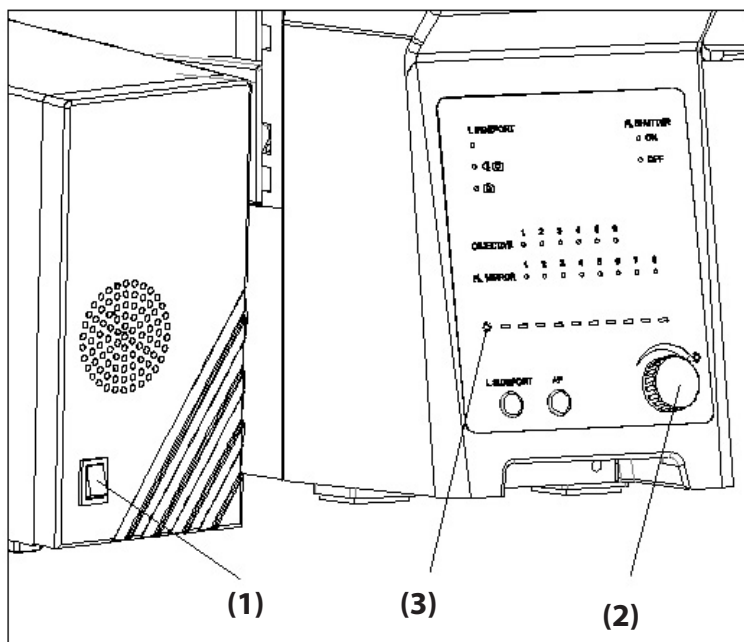


Figure 14



Refer to Figure 15. To direct light to the microscope eyepieces and / or the camera, toggle the button labeled "L sideport" (1) on the bottom left of the control panel. The light illuminated below the "L sideport" text (2) on the top left side of the control panel will indicate where the light is going. The light can either be directed entirely to the eyepieces, to the left eyetube and the camera, or entirely to the camera.

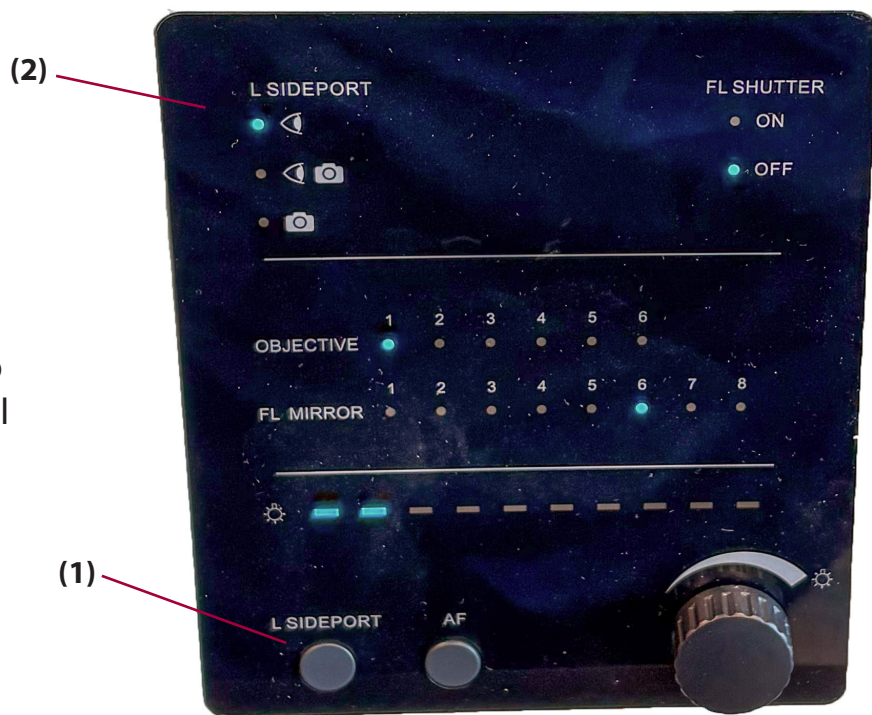


Figure 15



## Focusing the Objectives (Figure 16)

To adjust the microscope focus, first place a specimen on the stage. Rotate the nosepiece using the "Obj" (1) switch to select the lowest magnification objective lens for viewing the sample. Manipulate the mechanical stage using the knob (2) to move the sample into the field of view of the objective. Ensure that the condenser (3) is in Brightfield mode and that the light is going entirely to the eyepieces (4) (refer to the previous step). While looking through the eyepieces, adjust the focusing by first using the coarse focus knob (5) and followed by the fine focus knob (6) until the image seen through the eyepieces is clear.

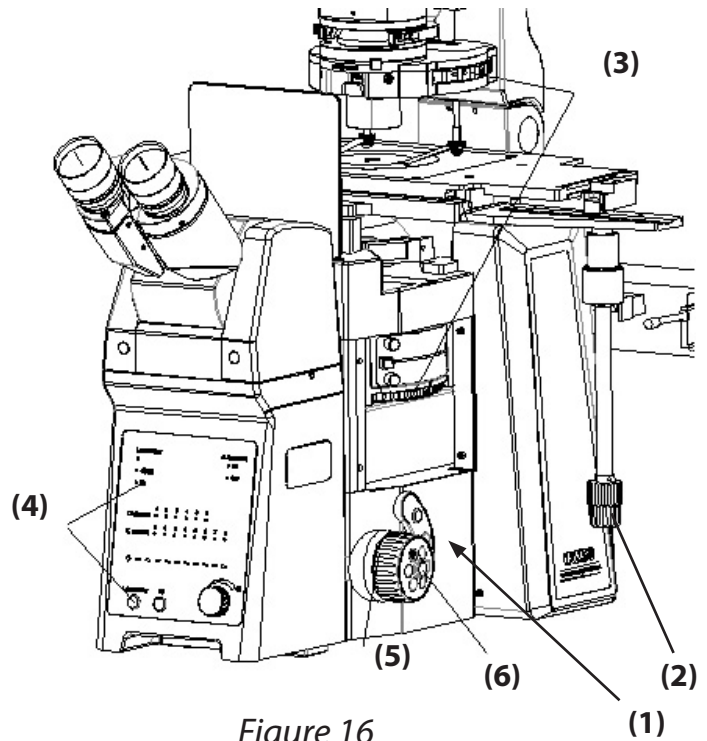


Figure 16



## Adjusting the Viewing Angle

To optimize the viewing angle for comfortable use, the eyepieces may be moved up or down as shown in Figure 17. Using both hands, hold onto the eyetubes (1) and gently maneuver them up or down to achieve desired viewing position. The viewing angle can be adjusted to be between 20 and 45 degrees. **Note: Do not try to force the eyepieces to move above or below the limits of the upper or lower viewing angles.**

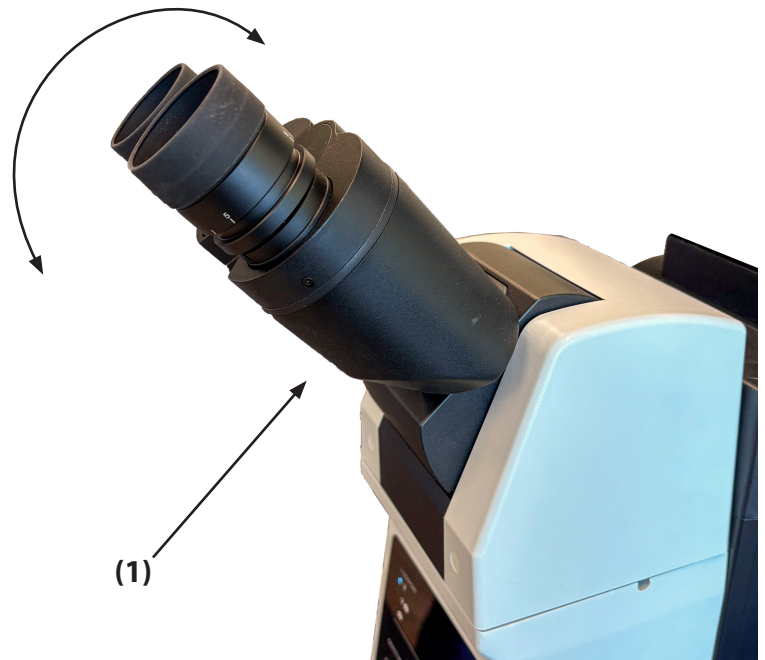


Figure 17



## Interpupillary Distance Adjustment

Adjust the interpupillary distance by grabbing the base (1) of each eyepiece with one of your hands and moving the eyepieces into a comfortable position for observation as shown in Figure 18. The interpupillary distance can be adjusted between 50 and 76mm. The distance is indicated by where the dot (2) is on the scale on the left eyepiece. (Remember your preferred interpupillary distance for future reference if sharing the microscope with multiple users.)



Figure 18



## Diopter Adjustment (Figure 18)

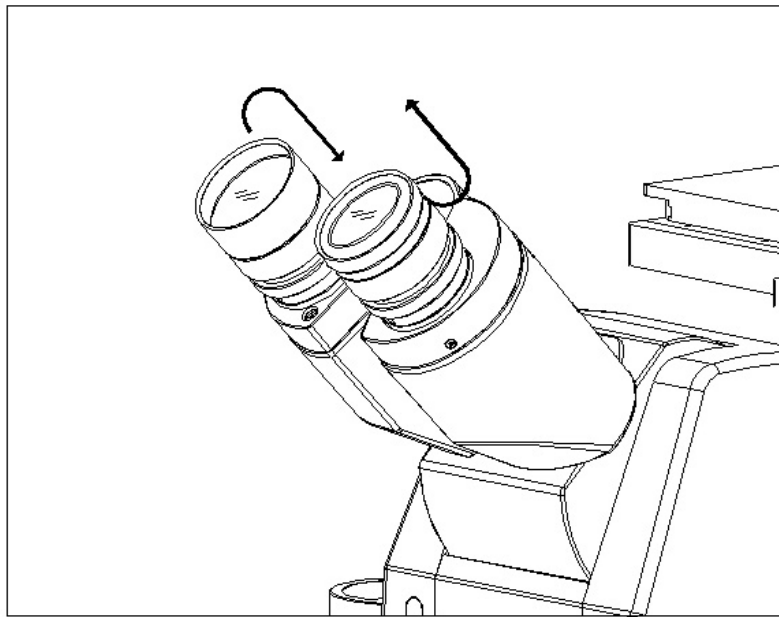
After the image is clear through the right eyepiece, observe the left eyepiece with the left eye. If the image is not clear enough, rotate the diopter adjustment ring (3) until the image is clear. There are +/-5 diopters on the diopter adjustment ring, and the value aligned with the scale (4) is your eye's diopter setting. If multiple people are using the microscope, remember your diopter setting for faster transitions between users.





**Using the Eyeshields** (Figure 19) Keep the eyeshields on the eyepieces folded down if wearing glasses to prevent the glasses from touching the eyepieces or the glass of the glasses.

If not wearing glasses, you may open the eyeshields so that stray light does not disturb the observation.



*Figure 19*



## Centering the Condenser

(Figure 20)

Adjust the field diaphragm with the upper dial by moving it all the way clockwise to fully open the top light source (1). Move the 10x objective into the light path and focus on a specimen. Then, rotate the dial (1) counterclockwise to put the field diaphragm into its narrowest position. The field diaphragm will then be visible through the eyepieces. Next, rotate the knob (2) to move the condenser until the image is clear. Using 2 hex keys simultaneously, adjust the set screws on the front of the condenser (3) to center the image in the field of view. Gradually reopen the field diaphragm (1) by turning the dial clockwise. If the image visible through the eyepieces is at the center of the field of view the whole time, the condenser has been centered correctly.

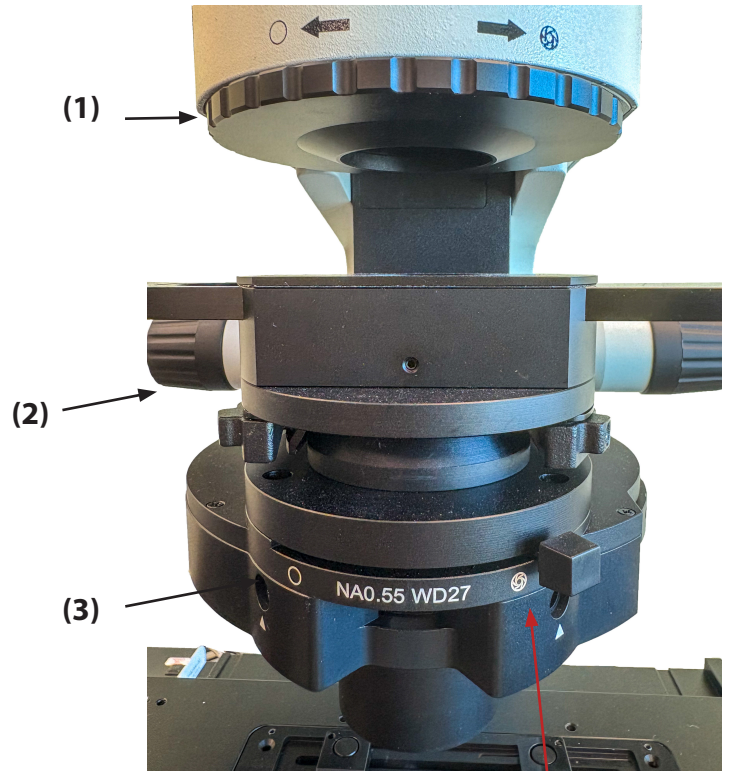


Figure 20



## Adjusting the Aperture Diaphragm (Figure 20)

The aperture diaphragm on the condenser allows the user to control the numerical aperture of the microscope, which allows for better resolution and contrast and increased depth of field while looking at images. The condenser diaphragm should be adjusted according to the numerical aperture (NA) of the objective lens being used. In most cases, the condenser should be adjusted such that its NA is 70%-80% of that of the objective lens being used. To adjust the aperture diaphragm, move the dial (4) in Figure 20 to the right to close or to the left to open.

# IRB70 Microscope Troubleshooting

PROBLEM	POSSIBLE CAUSE	SOLUTION
The light bulb is on but the field of view is dark.	Field diaphragm is not large enough.	Enlarge the field diaphragm.
	Condenser is not centered.	Center the condenser.
	Condenser is too low.	Adjust the condenser.
Image is not clear.	There is no cover glass on the specimen slide.	Put an appropriate sheet of cover glass on the slide.
	The specimen is facing down.	Orient the specimen to face up.
	Immersion oil has accumulated on a dry objective lens.	Carefully clean the lens according to the manufacturer's instructions.
	Immersion oil was not used for the oil immersion lens.	Use immersion oil.
	Stain or dust has accumulated on the eyepiece lens.	Clean the eyepiece.
	The aperture diaphragm was not opened correctly.	Adjust the aperture diaphragm.
	The condenser is in the wrong position (likely too low).	Adjust the condenser.
The image moves when touching the stage.	The stage is fastened incorrectly.	Fasten the stage correctly.
The bulb doesn't work.	No power supply.	Check the connection of the power supply.
	The bulb is not installed correctly.	Install it correctly.
	The bulb burned out.	Replace it.
The bulb burns out often.	The wrong bulb is used.	Replace it with the correct bulb.
The illumination is not bright enough.	The wrong bulb is used.	Replace it with the correct bulb.
	The use of light adjustment knob is wrong.	Adjust it correctly.
The bulb flickers or the brightness is not stable.	The bulb will burn out soon.	Replace it with a new one.
	The wire doesn't connect well.	Connect it correctly.

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