UNICO®

IP755 Phase Contrast

INFINITY MICROSCOPE

OPERATION MANUAL

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Phase Contrast Operation Guide

Phase Kit for IP755 Microscope

		
Phase condenser set at 40X	Phase condenser centering rods	Phase contrast objectives

Below are instructions to be used with UNICO® IP750 Series Microscope User's Manual. For all information related to microscope setup, operation and maintenance please refer to the user's manual that comes with the microscope.

Please read this entire guide before you use your phase contrast microscope.

1. Introduction

A phase contrast microscope is setup differently than a typical bright-field microscope. To create a phase contrast observation environment, a phase ring (dark ring) and a phase annulus (bright ring) are required in the optical system. The dark phase ring is installed in the phase objective, and the phase annulus (bright ring) is installed in the phase contrast condenser. For best phase contrast results, both rings must be overlapped so that no DIRECT light from illumination will pass directly to the eyepieces.

For optimal use, the alignment must always be maintained to ensure that the phase ring in the phase objective and the phase annulus rings in the phase condenser are overlapped. Proper alignments include:

1. Condenser alignment in line with the microscope optical system:
   Field diaphragm ⟷ Condenser ⟷ Objective

2. Alignment of phase annulus (centerable) in phase condenser with the phase ring in objective (stationary):
   Phase annulus ring in phase condenser ⟷ Phase ring in objective

Both alignment functions are equally important. The optical alignment of the condenser is essential and must be addressed first. For condenser optical alignment, please refer to "Condenser Alignment Check" section 4

2. Phase Contrast Kit

Depending on how you have ordered your phase contrast microscope, in addition to the 4x bright-field objective, the phase contrast kit may include the following items:

1 ea. 10X plan phase contrast objective
1 ea. 40X plan phase contrast objective
1 ea. 100X plan phase contrast objective
1 ea. Phase contrast centering telescope (optional)
1 ea. Turret Phase Condenser with iris diaphragm and 5 positions
("10x" for 10x phase; "40x" for 40x phase; "100x" for 100x phase;
"BF" for bright-field observation;"DF" for darkfield observation.)

		
Turret Phase Condenser	Phase Contrast Objectives	Centering Telescope(optional)

The IP755 phase contrast microscope comes with the turret condenser and 10x, 40x, and 100x phase objectives installed. The phase contrast phase kit may be ordered separately.

3. Setup and Use the Phase Contrast

3.1 Setup Phase Contrast

If you have purchased the complete Model IP755 phase microscope, the installation has been done at the UNICO facility. Just make sure the condenser is securely fastened and is raised to the highest position. You may need to do alignment checks. Please refer to Section 4 for "Condenser Alignment Check" and Section 5 for " Phase Annulus Ring Alignment Check"

IP755 Phase Condenser and Phase Objectives Installed

If you have purchased the non-phase model of the IP750 series microscope with bright field objectives and Abbe condenser and have just received the phase kit to convert it to a phase microscope, please follow the procedures listed below to set it up:

3.1.1 Lower the Abbe condenser by turning the substage knob located on the left side underneath the mechanical stage.
3.1.2 Unscrew the condenser locking screw located on the right side of the condenser holder, remove the Abbe condenser and store it in a safe place;
3.1.3 Install the turret phase condenser into the condenser holder. Lock the phase condenser with the condenser locking screw.
3.1.4 Raise the phase condenser to its highest position by turning the substage knob on the left side.
3.1.5 Install the phase objectives into the revolving nosepiece.
3.1.6 Check the alignment before using phase contrast. Please refer to section 4 for "Condenser Alignment Check" and section 5 for "Phase Annulus Ring Alignment Check".

3.2 **Use the Phase Contrast**

3.2.1 Turn on the IP755 microscope. Set condenser at "BF" position first. Turn the field diaphragm to open.
3.2.2 Turn the nosepiece to bring the 4X objective. Use the light intensity adjustment knob to set to proper brightness. Put your slide on the stage. Use the coarse and fine focusing knob to bring the image into focus. Please note that it is normal that the image from phase slide may not be very sharp using 4X bright field objective.
3.2.3 Turn the nosepiece bring 10X phase contrast objective in. Turn the turret condenser until marked "10" position.

Note: When changing the condenser settings, please use TWO hands to avoid pushing the condenser out of alignment. You must hold the turret condenser steady with one hand, while changing the setting with the other hand. This will prevent you from having to re-center after each objective/condenser switch.

3.2.4 Use fine focusing knob to bring the image into sharp focus.
3.2.5 Repeat the same procedure for other phase objectives.

4. Condenser Alignment

It is recommended that you do the "Condenser Alignment Check" before you use the phase contrast to help avoid misuse or error.

Note: When changing the condenser settings, please use TWO hands to avoid pushing the condenser out of alignment. You must hold the turret condenser steady with one hand, while changing the setting with the other hand. This will prevent you from having to re-center after each objective/condenser switch.

4.1 **Condenser Alignment Check**:

4.1.1 Set up your microscope as instructed in the microscope operation manual. Turn on the light.
4.1.2 Turn the nosepiece and bring either 4X or 10X objective into position.
4.1.3 Raise the phase condenser to the highest position by turning the substage knob. Turn the condenser disc to "BF" position.
4.1.4 Put a slide on the mechanical stage and hold it with slide holder. Use coarse and fine focusing knob to bring the image into focus.
4.1.5 Fully close the field diaphragm (on top of the base above collecting lens).
4.1.6 Look through the eyepiece. You should see a small "pin-hole" light spot in the field. This pinhole is the image of the field diaphragm. It should be in the center of the field. If not, please refer to the section 4.2 for "Condenser Alignment Adjustment".

4.2 Condenser Alignment Adjustment

If the condenser is found not aligned (refer to "Condenser Alignment Check" above), following the steps blow to make proper alignment:

4.2.1 Make sure the condenser locking screw is tight. This locking screw is on the right side of the condenser holder. Raise the condenser to its highest position using the sub-stage knob located on the left side of the sub-stage/condenser-holder assembly.
4.2.2 Keep the field diaphragm closed and 4X or 10X objective in working position, turn the two condenser centering thumb-screws located in front of the condenser holder at 4:00 0'clock and 7:00 0'clock. When you rotate the screws, you will see the pinhole is moving its position in the field of view. Adjust the screws until the pinhole is at the center of the field. Then open the field diaphragm.

5. Phase Annulus Ring Alignment Check

Note: 1. This must be checked after the condenser alignment has been checked and aligned.
2. Centering telescope is required.

5.1.1 Turn 10X phase objective into working position. Put a slide on the mechanical stage. Rotate the phase condenser disc to "BF" position. After bringing the slide into focus, remove the slide. The mechanical stage is now in working position.

5.1.2 Remove the right eyepiece from eyepiece tube. Open the field diaphragm to its full opening. Insert the centering telescope in the right eyepiece tube. Loosen the locking screw on the telescope.

5.1.3 Look through the telescope and see the dark ring in the 10X objective. If the phase ring is not in sharp focus, push or pull the top portion of the telescope until you see a sharp ring image. Lock the telescope with the locking screw.

5.1.4 Turn the phase condenser disc to "10X". This will bring the 10x phase annulus ring into optical system (working position).

5.1.5 Look through the telescope. If the phase annulus ring is overlapping with the phase ring in the objective, you will only see a dark ring in a light-dark background and there is no direct bright light coming through. If you see a bright ring, and the ring is not centered, you need to align the phase annulus. Please refer to the section 5.2 for "Centering Phase Annulus".

5.1.6 Turn 40X phase objective into working position. Rotate the condenser disc to "40X". Check the overlapping. If not overlapped, center the 40X phase annulus ring (Section 5.2).

5.1.7 Repeat the same procedures for 100X phase annulus ring alignment check.

5.2 Centering Phase Annulus Ring

Note: 1. Condenser alignment must be checked and properly aligned. For more information, please refer to "Condenser Alignment Check" in Section 4.
2. Centering telescope is required.

5.2.1 Refer to "Phase annulus alignment check" and finish the alignment check procedures. Make sure the reading on the phase condenser disc matches the power of the phase objective in position. If the phase ring and phase annulus are overlapping, realignment is not required. If they are not overlapping, then follow the following steps to align the phase annulus.

5.2.2 Check and make sure that the phase condenser disc is set at the same magnification power that matches the power of the phase objective. The mechanical stage is in working position.

5.2.3 The two phase annulus centering rods are located in the back of the phase condenser at 10 o'clock and 2 o'clock. Press down and hold the rod to engage rods.

5.2.4 Look through the centering telescope. Rotate the rods until the dark phase ring overlaps with the bright annulus ring. (Minor adjustments may only be required. Turn each rod slowly and see the direction the ring is moving. This can avoid moving the annulus ring to wrong direction). Release the rods when the alignment is done.

5.2.5 Repeat the above procedures for any other phase annulus alignments.

5.2.6 Remove the telescope and insert the 10X eyepiece into eyepiece tube.

The phase system is ready to use. Make sure your phase annulus ring (or the condenser setting) always matches the phase objective. If you use bright field observation, turn the turret to " BF" position and the phase condenser becomes a bright field Abbe condenser. Set the turret condenser at "DF" turns it into a darkfield condenser.

Photo & Nomenclature

UNICO® IP750 Series Compound Microscope