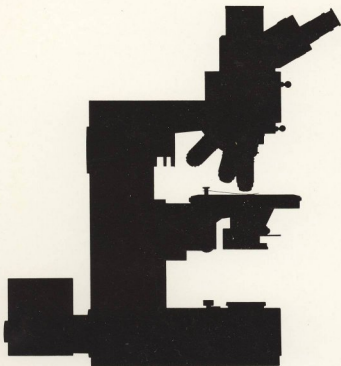


# ORTHOLUX<sup>®</sup> 2 POL



## Special Instructions

to be used in conjunction with instruction booklet 512-120/Engl.  
(ORTHOLUX 2)



# ORTHOLUX 2 POL



## Instructions

	Page
<b>1</b> Technical description . . . . .	2
<b>2</b> Assembling the microscope . . . . .	3
<b>3</b> Adjusting the microscope for transmitted-light work . . . . .	3
31 Orthoscopic observation . . . . .	3
32 Conoscopic observation . . . . .	5
<b>4</b> Adjusting the microscope for reflected-light work . . . . .	6

## 1 Technical description

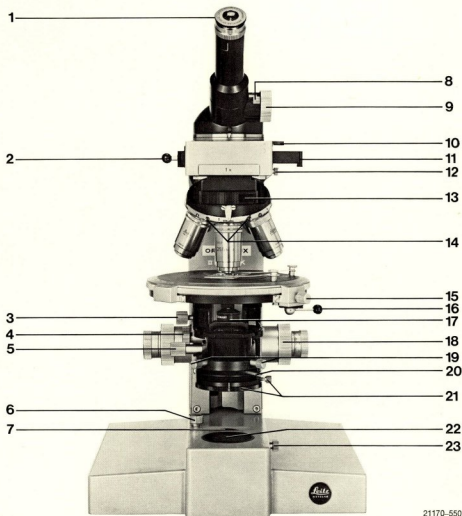


Fig. 1  
ORTHOLUX 2 POL MK with centring revolving nosepiece and fixed analyser (condenser racked down)

- 1 Eyepiece with focusing eyelens
- 2 Analyser slide
- 3 Clamping screw for stage changing device
- 4 Rack-and-pinion for vertical adjustment of condenser
- 5 Control for swing-out condenser top
- 6 Control for swing-out collector lens (should be swung out only for objective PI 1.0/0.4 (P))
- 7 Field diaphragm control
- 8 Pin-hole diaphragm lever for small-grain conoscopy (lever up: pin-hole diaphragm swung in)
- 9 Bertrand lens control (turned right: Bertrand lens in)

- 10 Locking lever for tube changer
- 11 Analyser cover plate
- 12 Clamping screw for nosepiece or clutch changer
- 13 Compensator slot (should be closed by blank slide when not in use)
- 14 Objective-centring screws
- 15 Clamp screw for stage rotation
- 16 45° click stop control (lever at rear: click stop disengaged)
- 17 Swing-out condenser top
- 18 Coarse and fine focusing adjustment
- 19 Condenser centring screws
- 20 Aperture diaphragm control
- 21 Knurled ring for rotation of polarizer and lock screw
- 22 Opening for dust glass (dust glass removed)
- 23 Dustglass clamp screw

## 2 Assembling the microscope

See Instructions 512-120 for ORTHOLUX 2, page 4-7.

In addition to the operations described in the afore-mentioned instructions, introduce the analyser (1.2) into the stand bracket and secure it on the right by means of the cover plate (1.11 and 3.2).

## 3 Adjusting the microscope for transmitted-light work

For centration of light sources, see Instructions 512-120 for ORTHOLUX 2, pages 6 and 7.

### 3.1 Orthoscopic observation

Switch on filament lamp.  
Slide out analyser (1.2) by shifting it to the left.

With your eyes relaxed (focused at infinity), adjust the focusing eyelens (1.1) until the crosshairs appear sharp.  
Swing out Bertrand lens (1.9) or (2.9), depending on equipment, and pin-hole diaphragm (1.8 or 2.10), depending on equipment.

**ORTHOLUX 2 POL BK:**  
In addition, slide out auxiliary lens for small-grain conoscopy (2.10).

Place specimen on stage and focus by means of coarse and fine adjustment (1.18).

When using binocular or trinocular tube body: see instructions 512-120 for ORTHOLUX 2, pages 8 and 9.

### For equipment with objective centring clutch (Fig. 2):

Screw transmitted-light objective (engraved with tube length 170) into an objective centring ring and lock it in position on the clutch changer by counter-clockwise rotation while keeping the clutch release (2.5) depressed.

Attach centring keys to the two centring screws on the right and left, above the objective, (2.6) or (1.14) depending on equipment, and turn it until the centre of rotation of the object image (which can be found by turning the stage) coincides with the eyepiece crosshairs. (This centration is required only once for every objective.)

Swing in collector lens (1.6) in the microscope base. Collector to be swung out only for use of objective PI 1/0.04 (P).

Close field diaphragm (1.7) and focus it into the specimen image plane by racking the condenser (1.4) up or down.

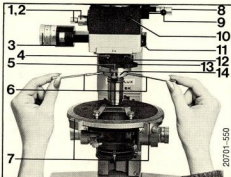
**Note:** The condenser top (1.17) should be swung out only in conjunction with objectives of N.A. < 0.25.

Centre image of field diaphragm by means of condenser centring controls (1.19).

Open field diaphragm (1.7) just far enough to clear the periphery of the field of view. (For details see Instructions 512-120 for ORTHOLUX 2, pages 18 and 19.)

Fig. 2  
Objective clutch changer on ORTHOLUX 2 POL BK stand with rotating analyser.

- 1, 2 Bertrand lens centring screws
- 3 Rotating analyser with locking screw behind
- 4 Auxiliary lens control for small-grain conoscopy
- 5 Objective centring clutch
- 6 Centring keys
- 7 Verniers on rotating stage
- 8 Bertrand lens focusing knob
- 9 Bertrand lens control knob
- 10 Pin-hole diaphragm for small-grain conoscopy (for use in conjunction with auxiliary lens 4)
- 11 Clamping screw for clutch changer or nosepiece
- 12 Centring control for auxiliary lens
- 13 Compensator slot
- 14 Objective centring ring



**Lamp housing 50** (Instructions for ORTHOLUX 2, page 6, Fig. 8.23). Refocus lamp condenser until the object field is evenly illuminated.

**15-W lamp housing** (Instructions for ORTHOLUX 2, page 7, Fig. 10.37). Shift lamp socket until the object field is evenly illuminated.

After this lamp adjustment, illuminator of the aperture, as a rule, is uniform. Check: Remove eyepiece from tube or use Bertrand lens (1.9).

### Crossing the polarizers

Move analyser (1.2) to the right into the light path.

After loosening its locking screw, set the rotating analyser (2.3) to the 90° position. Adjust polarizer (1.21) until the field, without a specimen, shows maximum darkness. Particularly accurate crossing of polarizers is possible by using the Bertrand lens (1.9). In this case, a blurred symmetrical cross will be visible.

Retighten the locking screws of polarizer and analyser (1.21, 2.3).

Set the aperture diaphragm (1.20) for the desired image contrast.

### 45°-click stop

The 45°-click stop (1.16) of the rotating stage allows the specimen to be rotated by exactly 45°. The built-in vernier need not be used for this purpose.

The 45°-click stop may be operated in any position of the stage. To engage it, swing lever (1.16) from the rear to the right.

Turn object stage to a click stop. Swing lever (1.16) to the rear. Turn object stage to the desired click stop. Swing lever (1.16) to the right. The object stage now engages at the desired position and 7 further positions with 45° intervals.

### 3.2 Conoscopic observation

The observation of interference figures (conoscopy) is possible only at higher illuminating and viewing apertures (numerical aperture at least 0.65). In addition, the instrument must be carefully adjusted for orthoscopic observation as described above (section 3.1).

Switch on filament lamp. Find an object of suitable orientation. Use a high-aperture objective, e.g. FJ 63/0.85 P.

Fully open aperture diaphragm (1.20). Swing in Bertrand lens (1.9 or 2.9).

### ORTHOLUX 2 POL BK:

Focus conoscopic image by means of knob (2.8).

Centre Bertrand lens with the two centring screws (2.1 and 2.2) so that the objective pupil is concentric with the eyepiece crosshairs.

### For conoscopic observation of very small grains:

Close down field diaphragm (1.7) and, in addition, swing in pin-hole aperture (1.8).

### ORTHOLUX 2 POL BK:

Move auxiliary lens for small-grain conoscopy (2.4) into the light path and centre it (2.12).

Conoscopic observation using oil immersion objectives

**Öi 100/1.30 P and NPI Öi 100/1.30 P:**

Exchange front lens of condenser „Achr. 0.90 P“ for front lens No. 004“ P Öi 1.33“. For the determination of optical properties, see table on page 6.

Orientierung des Kompensatorplättchens	Einachsig		Zweiachsig			
	+	-	+		-	

\* Beim  $1/4\lambda$ -Glimmerplättchen treten an Stelle der schwarzen Bogen schwarze Punkte auf.

\* with the  $1/4\lambda$  mica plate black dots replace the black arcs.

26290 c-550

Table for the determination of the optical character

## 4 Adjusting the microscope for reflected-light work

Screw reflected-light objective into the centring ring (3.7) and lock it in position on the vertical illuminator by turning it clockwise. To do this, press the locking bar (4.8) down. Reflected-light objectives are engraved  $\infty$  (tube length), for identification.

Level specimen by means of a mounting press and secure it on the stage after coarse vertical adjustment of the stage (4.10).

Switch on filament lamp.

When using binocular tube body be sure to adjust interpupillary distance correctly.

With your eye relaxed (focused at infinity), adjust the focusing eyelens (1.1)

until the crosshairs appear sharp. Swing out Bertrand lens (1.9) and pin-hole diaphragm (1.8). (Does **not** apply to ORTHOLUX 2 POL MK with binocular or trinocular tube body as in Fig. 4.)

Swing out analyser (3.2) by shifting it to the left. Move plane-glass plate into the light path by pulling out lever (3.4 or 4.11). Focus specimen by means of coarse and fine adjustment (1.18) of stage.

With binocular and trinocular tube body: adjust left eyepiece tube until the image is in focus also with the left eye.

With binocular and trinocular tube body: adjust left eyepiece tube until the image is in focus also with the left eye.

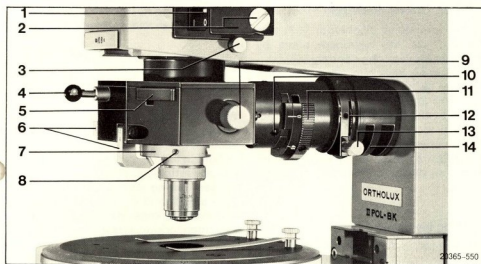


Fig. 3

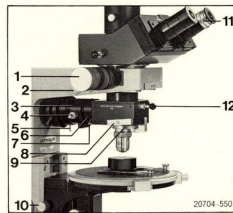
POL-Vertical Illuminator

- Control for swing-in grey filter in clear aperture of the analyser, preventing glare when analyser is out (for rotating analyser only)
- Interchangeable analyser with detachable cover plate
- Clamping screw for POL-Vertical Illuminator
- Lever for shifting from plane glass to compensating prism
- Compensator slot close with blank slide when not in use!
- Safety clutch and release bar for objective changer
- Objective centring ring
- Objective centring screws (left one not shown)
- Focusing control for field diaphragm
- Centring control for field diaphragm
- Polarizer (rotating)
- Half-stop (move into light path only in conjunction with compensating prism, see Fig. 5)
- Vertical adjustment of aperture diaphragm
- Filter Holder

Fig. 4

POL-Vertical Illuminator on ORTHOLUX 2 POL MK with trinocular tube body FS 55

- Rotating analyser
- Locking screw for rotating analyser
- Clamping screw for polarizer insert
- Locking screw for polarizer rotation
- Aperture diaphragm control lever
- Centring screws for field-of-view diaphragm (right one not shown)
- Field-of-view diaphragm control lever
- Release bar for safety clutch
- Objective centring ring
- Clamp screw for extended vertical stage adjustment
- Lever for shifting from plane glass to compensating prism
- Eyepiece with focusing eyelens



### Centring the objectives

Slip centring keys onto left and right centring screws (3.8) of the centring ring (3.7) and turn them until the centre of rotation of the object coincides with the eyepiece crosshairs. This centration is required only once for every objective.

### Centring the field diaphragm

Close down field diaphragm (4.7) and focus it into the specimen plane by means of the focusing control (3.9).

Slip centring keys laterally from below onto the two centring screws on the left and right (3.10) of the vertical illuminator and centre the field diaphragm accurately to the object field. After each change of objectives the field diaphragm should be adjusted so that never more than the visible object field is illuminated.

### Centring the filament lamp

ORTHOLUX 2 POL MK: Remove eyepiece.

ORTHOLUX 2 POL BK: Swing in Bertrand lens (2.9).

Adjust condenser of lamp housing and slightly rack down the specimen stage until the lamp filament can be clearly seen in the tube.

Centre the filament as for transmitted light.

Adjust lamp condenser (in the case of lamp housing 50) or lamp socket (in the case of 15-w lamp housing), until the aperture is evenly illuminated.

### Adjusting the aperture diaphragm:

a) When using the plane glass (for high-aperture work):

By turning adjusting screw (3.13), centre the aperture diaphragm vertically in relation to the objective pupil (Fig. 5).

Swing out half-stop (3.12).

b) When using the Berek compensating prism (for high accuracy of degree of polarization):

Centre aperture diaphragm and half-stop (6.1 and 6.3), as shown in Fig. 6.

Replace the eyepiece in the tube or remove Bertrand lens.

Open or close aperture diaphragm (4.5) for the desired image contrast.

### Crossing the polarizers

Slide analyser to the right into the light path (1.2).

With rotating analyser (2.3):

Loosen locking screw and set analyzer accurately to  $90^\circ$ .

Retighten locking screw.

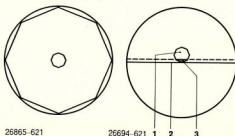
Use an isotropic specimen.

Loosen locking screw of polarizer (4.4). Turn polarizer (3.11) until the position of maximum darkness has been reached.

Retighten locking screw.

Fig. 5  
Centring of aperture diaphragm with plane glass, either wide open or closed

Fig. 6  
Centring of aperture diaphragm when using the Berek compensating prism  
1 Aperture diaphragm (closed)  
2 Edge of prism  
3 Edge of half stop







® = Registered Trademark

Design subject to alterations without notice.

## **ERNST LEITZ GMBH D-6330 WETZLAR**

Subsidiary: Ernst Leitz (Canada) Ltd., Midland, Ontario

List **550-50/Engl.**

Printed in W-Germany

V/75/FX/L