User manual

iScope

iscope® by euromex

euromex microscopen bv
The Netherlands
www.euromex.com

The iScope series has been designed with all kind of Life Sciences applications and great durability in mind. This resulted in a modern, robust and high level microscope for everyday use, equipped with excellent optical and mechanical components. Specific attention to production methods resulted also in an excellent price/performance ratio

Models

Models	Bino	Trino	EWF 10x 20 mm	EWF 10x 22 mm	E-Plan objectives	Plan Phase objectives	E-Plan IOS objectives	Plan IOS pbjectives	Plan Phase IOS objectives	Mechanical rackless stage	iCare sensor	Köhler LED
IS.1152-EPL	•		•		•						•	
IS.1153-EPL		•	•		•						•	
IS.1152-PLPH	•		•			•					•	
IS.1153-PLPH		•	•			•					•	
IS.1152-EPLi	•			•			•			•	•	
IS.1153-EPLi		•		•			•			•	•	
IS.1152-PLi	•			•				•		•	•	•
IS.1153-PLi		•		•				•		•	•	•
IS.1152-PLPHi	•			•					•	•	•	•
IS.1153-PLPHi		•		•					•	•	•	•

Objectives

E-Plan EPL	4x/0.10	10x/0.25	20x/0.40 (1)	S40x/0.65	S60x/0.85 (1)	S100x/1.25 (2)
E-Plan EPLi IOS	4x/0.10	10x/0.25	20x/0.40 (1)	S40x/0.65		S100x/1.25 (2)
Plan PLi IOS	4x/0.10	10x/0.25	20x/0.40 (1)	S40x/0.65	S60x/0.85 (1)	S100x/1.25 (2)
Plan Phase PLPH		10x/0.25	20x/0.40	S40x/0.65		S100x/1.25 (2)
Plan Phase PLPHi IOS		10x/0.25	20x/0.40	S40x/0.65		S100x/1.25 (2)

(1) optional objectives *(2) oil immersion objectives*

The S40x, S60x and S100x objectives are equipped with a spring mount, to prevent damage to the front lens and the slide.

The Numeric Aperture - N.A. – of the objective is an indication for the resolving power of the objective.

The total magnification can be calculated by multiplying the magnification of the eyepiece with the magnification of the objective. The magnifications are displayed in the table below:

Eyepiece	Objective	Magnification
10x	4x	40x
10x	10x	100x
10x	40x	400x
10x	60x	600x
10x	100x	1000x

Construction of the microscope

The names of the several parts are listed below and are indicated in the picture:

A) Microscope head
B) Eyepieces
C) Diopter adjustment
D) Nosepiece
E) Objectives
F) Stage with X-Y mechanical stage
G) X-Y stage controls
H) Condenser with iris diaphragm
I) Kohler iris diaphragm
J) Collector lens
N) Slide protection handle
O) Height adjustment condenser
I) Kohler iris diaphragm
J) Collector lens
K) iCare sensor
L) Light intensity adjustment knob
M) Coaxial coarse adjustment

Preparing the iScope microscope for use

Your microscope is a delicate product, please handle it with care.

Carefully remove the items from their packing and place them on a flat, firm surface. Please do not expose the microscope to direct sun light, high temperatures, damp, dust or acute shake. Please make sure the worktable is flat and horizontal.

When moving the microscope, use the left hand to hold the transport handle at the backside of the microscope and with the right hand the bottom of the microscope.

Transport handle 

Caution! Holding the microscope with the stage, the stage focusing knob will damage the microscope.

Insert the power cord in the backside of the microscope and use the cable storage CSS - Cable Storage System – to store the cable after use

CSS - Cable Storage System 

Caution! If the bacterial solution or water splatters over the stage, objective or head, pull out the power cord immediately and dry the microscope.

For safety reasons, make sure the power switch is turned off and remove the plug before replacing the led unit or fuse

Assembling Steps

Euromex Microscopes will always try to keep the number of assembly steps for their customers as low as possible but in some cases there are some steps to be taken. The steps mentioned below are often not necessary but described for your convenience nonetheless.

Mounting the objectives

1. Rotate the coarse focusing knob to lower the stage to the lowest position.
2. Install the objectives into the objective nosepiece from the lowest magnification to the highest in a clockwise direction from the rear side of the microscope. When using the microscope, start using the low magnification objective (4X or 10X) to search for specimen and focus, and then continue with high magnification objective to observe.

The microscope head

The standard iScope series configuration is supplied with the head assembled. However, if your order contains the fluorescence it should be mounted first. The dovetail on the bottom side of these parts fits into the slot on the top side of the other parts.

Placing the eye pieces

1. Remove the cover of eyepiece tube.
2. Insert the eyepiece into the eyepiece tube

The eyeshades

Each eyepiece has its rubber eyeshade. This prevents damage to the lens, and prevents stray light. The eyeshade can simply be slipped over the eyepiece.

Connecting the power cord

The iScope series microscopes supported a wide range of operating voltages: 100 to 240V. Please use a grounded power connection.

1. Make sure the power switch is off before connecting.
2. Insert the connector of power cord into the iScope power socket, and make sure it connects well.
3. Insert the other connector into the mains socket, and make sure it connects well.

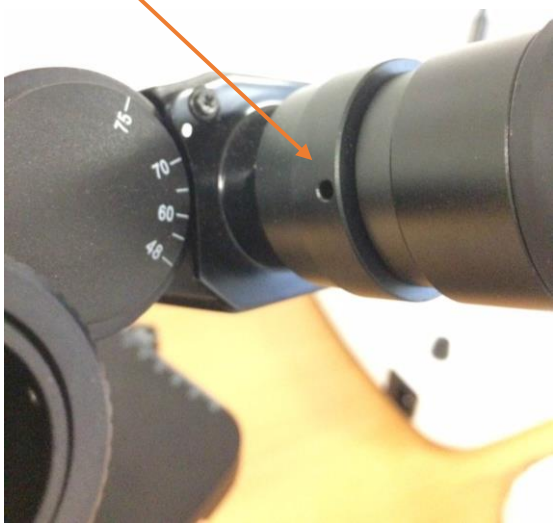
Don’t use bend or twist the power cord, it will get damaged. Using the special cord supplied by Euromex. If it’s lost or damaged, choose one with the same specifications.

Locking the eyepieces on iScope

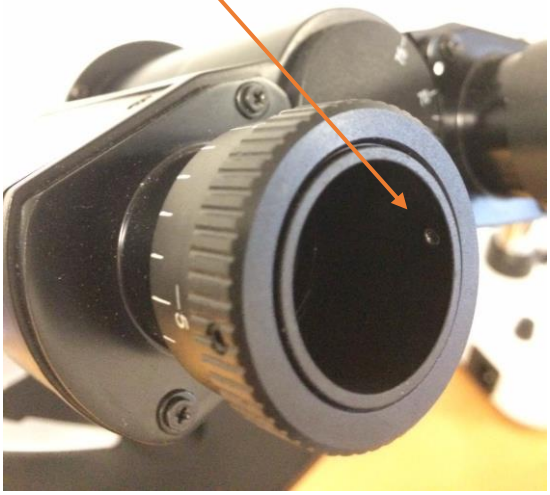
For models without diopter adjustment, please find the screw for locking the eyepiece on the tube ring here(A). Please note that location can be slightly rotated from model to model

For models with diopter adjustment, take out the eyepiece and look into the tube to find the right position of screw(B)

A



B



Operation:

Setting up the illumination
For optimum effect in contrast and resolution one should follow the below procedure:

Place a specimen on the object stage and focus using the 4x objective, with a fully opened iris diaphragm.

- Turn light intensity to lowest position, then look through the eyepiece(s) and turn up to comfortable intensity level
- Turn the condenser in the highest position(for phase contrast models, please set condenser to bright field position).
- Close the iris diaphragm, until it is just visible on the edge of the field of view.

The microscope is properly set for use with the 4x objective. For each other magnification in bright field use this procedure should be repeated to ensure the best balance between contrast and resolution. Phase contrast use will be explained later in this manual.

Place the specimen slide

1. Push the arm of the specimen holder backwards.
2. Release the arm slowly clamping the slide with the cover glass facing up.
3. Rotating the X and Y-axis knob will move the specimen to the center for alignment with the center of the objective.

Focusing and slide protection

1. Select the objective 4x to the optical path.
2. Rotate the position screw to top, observe the right eyepiece with right eye. Rotate the coarse focusing knob until the image appears.
3. Rotate the fine focusing knob for detailed focusing
4. When focused with S100x objective, lock the slide protection handle. The slide protection handle protects the slide by limiting the travel of the table. This way the objectives will not touch or break your slides.

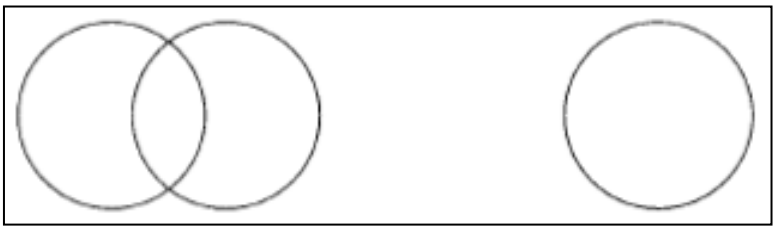
Adjusting the focusing tension

The iScope series microscope focusing knobs can be adjusted for tension. You can set it from light to heavy according your own preference. Please note that when the specimen leaves the focus plane after focusing or the stage declines itself, the tension should be set higher. To tighten the focusing arm (more heavy), rotate the tension adjustment ring according to the arrowhead pointed; to loosen it, please turn it in the reverse direction.

The interpupillary distance

Using a binocular (or trinocular) tube is less tiring for the eyes than the use of a monocular tube. In order to obtain a smooth “compound” image, one should go through the below steps.

The correct interpupillary distance is reached when one round image is seen in the field of view (see image below). This distance can be set by either pulling the tubes towards each other or pulling them from each other. This distance is different for each observer and thus should be set individually. When more users are working with the microscope it is recommended to remember your interpupillary distance for a quick set up during new microscopy sessions. The iScope’s swiveling eyepiece tube can be rotated 360º. You can select corresponding eye point height according to your own preference.



Field of view before adjustment

Field of view after adjustment

The correct eye point

The eye point is the distance from the eyepiece to the user’s pupil. To obtain the correct eye point, move the eyes towards the eyepieces until a sharp image is reached at a full field of view.

Adjusting the diopter

Using a binocular (or trinocular) tube is less tiring for the eyes than the use of a monocular tube. In order to obtain the right interpupillary setting, one should go through the below steps.

- Turn the diopter adjustment ring of the left eyepiece tube until the scale shows the same reading as on the indicator.
- Close the right eye and focus the left tube by means of the coarse- and fine adjustment knobs
- Close the left eye and focus the right tube with the diopter adjustment ring.

This procedure should be followed by each individual user. When more users are working with the iScope microscope it is recommended to remember your diopter setting for a quick set up during new microscopy sessions.

Abbe condenser

Beneath the object stage an Abbe condenser N.A. 12.5 is mounted. The condenser can be adjusted in height by means of a rack and pinion movement and knob. With this one can focus the light on

the specimen by which the contrast can be optimized. The condenser is factory pre-centered. If needed the following procedure can be followed to center the condensor.

1. Move the condenser to the highest position.
2. Select the 10x objective to the light path and focus the specimen.
3. Rotate the field diaphragm adjustment ring to put the field diaphragm to the smallest position.
4. Rotate the condenser up-down knob, and adjusting the image to be clearest.
5. Adjusting the center adjustment screw and put the image to the center of the field of view.
6. Open the field diaphragm gradually. If the image is in the center all the time and inscribed to the field of view, it shows condenser has been centered correctly.

The field (Köhler) diaphragm

By limiting the diameter of the beam entering the condenser, the field diaphragm can prevent other light and strengthen the image contrast. When the image is just on the edge of the field of view, the objective can show the best performance and obtain the clearest image. The diaphragm is factory pre-centered.

Adjusting the Aperture Diaphragm

1. The aperture diaphragm is used to select the numerical aperture of the illumination. When the N.A. of illumination is matching with the N.A. of the objective, the highest possible resolution, dept of field and contrast are obtained.
2. When contrast is low, rotate the diaphragm adjustment ring to 70%-80% of the N.A. of objective this will improve the contrast of the image. The diaphragm is factory pre-centered.

Use of the S100x oil-immersion objective

The Euromex iScope range microscopes are equipped with an S100x N.A. 1.25 oil immersion objective. Please follow these instructions for using this objective:

1. Remove the dust protection from the revolving nosepiece to mount the S100x objective.
2. Focus the image with the S40x objective.
3. Turn the revolving nosepiece so the S100x objective almost reaches the click-stop.
4. Put a small drop of immersion oil on the centre of the slide (always use Euromex Immersion oil).
5. Now turn the S100x objective so that you feel the click stop.
6. The front lens is in contact with the immersion oil.
7. Look through the eyepiece and focus the image with the fine adjustment knobs.
8. The distance between the lens of the objective and the slide is very small !
9. In case there are small bubbles visible turn the S100x objective a couple of times left/right so that the front of the objective moves in the oil and the bubbles will disappear.
10. After using the S100x objective turn the table with the fine adjustment knobs downwards until the front lens doesn't touch the oil any longer.
11. Always clean the front lens of the S100x objective with a piece of lens paper that is moistened with a drop of isopropanol. We recommend using Euromex lens paper isopropanol.
12. Clean the slide after use as well.

Illumination EUROMEX iScope series

The illumination has the following specifications:

- LED : 3W NeoLED for biocular and trinocular models.
- Power supply : Primary AC 100 - 240 Volt-50Hz.

"iCare" Function

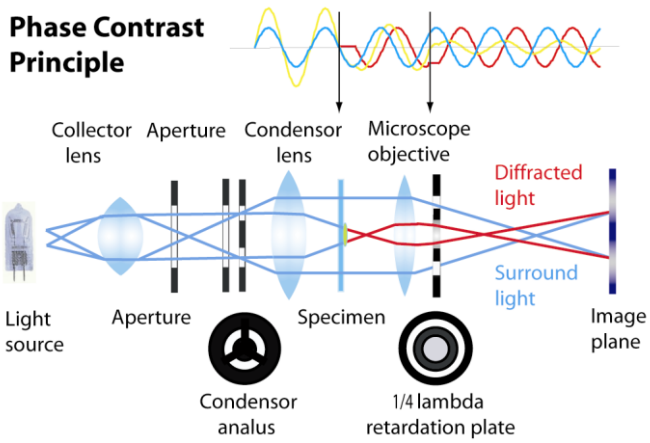
When people leave microscope after 20-30 minutes, the light source will be turned off automatically. The indicator(1) will flash once every 3 seconds. When people come back, press iCare function button(2), which will turn the light on again. To turn off the iCare function press the button for 3 seconds. This will cause the red indicator led(1) to turn off and the microscope light is always on. Press the button for another 3 seconds, it will make indicator flash and the iCare function is back on.

Phase contrast

Use of phase contrast with the iScope microscope

The phase contrast method was designed in 1934 by the Dutchman Frits Zernike to observe very thin or transparent objects. This technique uses the fact that light travelling through tissue undergoes a phase shift due to diffraction.

By recombining the phase shifted light with the background light, a contrasted image appears in the eyepiece



Using the Phase Contrast Slider

1. Keep the phase contrast slider face up (text up); insert it from left to right into the condenser slider socket as the direction of the arrow pointed.
2. Each slider has 3 positions, 2 phase contrast positions and in the center of the slide the bright field position for normal use without phase contrast. Each phase contrast objective used has to be matched with the phase contrast ring on the slider. For example: when the 10x phase contrast objective is used the slider should be positions to match the 10 phase diaphragm).

Note: the phase diaphragms in the sliders are pre-centered do not need to be adjusted in operation.

Using the Zernike phase contrast set.

Any iScope model with a Zernike phase contrast set comes with the condensor and objectives already mounted and centered on your microscope. If you suspect misalignment or want to check the alignment please see the next point for ”centering the phase rings”.

The height of condenser can be adjusted in height by means of a rack and pinion movement. In this way the light beam is concentrated in the specimen for an optimum resolution.

Centering the phase rings

The Zernike phase disc has five positions:
“DF” for dark field observation(upto 400x)
“BF” for bright field observation, this position also has an irisdiafragm.

And
“10/20”

“40”
“100”

Zernike condensor postion indication

bottom view of condensor

Which are corresponding to phase contrast observation using 10×、20×、40×、100×objectives respectively.

When the condenser is in the DF or BF position the objectives can be used for either dark field or bright field. For phase contrast, the condenser position should match the objective used. Meaning that when the condenser is in position “40” the objective used should also be 40x.

Rotate 10× infinity plan phase contrast objective into the field of view, then set the condenser to match the objective (marker “10/20”).

Take the eyepiece out of the tube and insert centering telescope in its place. Observed from centering telescope, the dark and bright ring images should coincide with each other as shown in the figures below. If the ring images can’t be observed clearly, first try and focus the centering telescope. If this does not solve the issue raise or decline the condenser

If the bright ring and dark ring images are not coincided as shown below, adjust the position of the ring with the two screw keys on the side of the condenser to move the ring until bright and dark ring images superimposed. Repeat for all objectives/Zernike disc positions.


Not centered


Centered properly

Maintenance and cleaning

Always place the dustcover over your iScope microscope after use. Keep the eyepiece and objectives always mounted on the microscope to avoid dust entering the instrument.

Cleaning the optics

When the eyepiece lens or front lens of the 10x or S40x objective are dirty they can be cleaned by wiping a piece of lens paper over the surface (circular movements). When this does not help put a drop of alcohol on the lens paper. Never put xylol or alcohol directly on the lens! Please note that Euromex offers a special microscope cleaning kit: PB.5275

It is not necessary – and not recommended – to clean the lens surfaces at the inner side of the objectives. Sometimes dust can be removed with high pressured air. There will never be dust in the objectives if the objectives are not removed from the revolving nosepiece.

Caution

Cleaning cloths containing plastic fibers can damage the coating of the lenses!

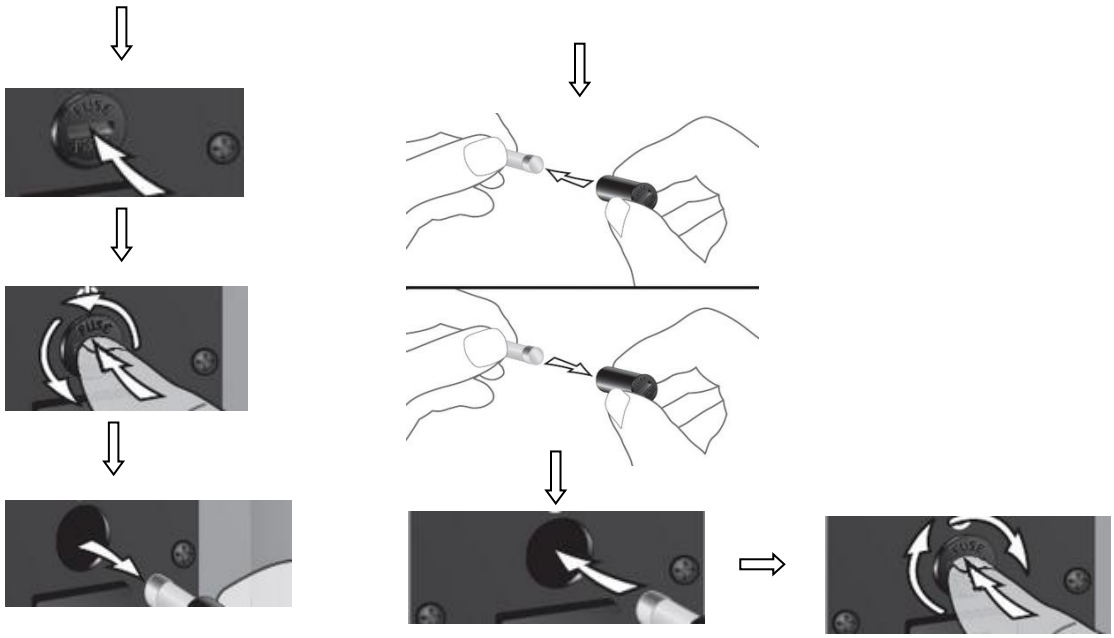
Maintenance of the stand

Dust can be removed with a brush. In case the stand or table is really dirty the surface can be cleaned with a non-aggressive cleaning product.
All moving parts like the height adjustment or the coaxial course and fine adjustment contain ball bearings that are not dust sensitive. With a drop of sewing-machine oil the bearing can be lubricated.

Replacing the fuse

To change the fuse, following the procedure below:

1. Unplug the system from power and place microscope flat, with base of microscope toward you.
2. Find the fuse cover that will appear as a round protrusion with a slot.
3. Use a small flathead screwdriver or other flat object (coin, etc) to gently push the fuse cover in and turn the cover counter clockwise. You need to turn the cover about 3/4 of a turn.
4. The fuse cover will pop out with the fuse attached.
5. Remove the fuse from the cover and examine the fuse. If the thin piece of metal going from one end of the fuse to the other has a gap, then the fuse is bad.
6. If the fuse is bad, install a replacement fuse in the cover.
7. Gently push the fuse cover with the new fuse back into the sub-woofer until it is flush with the unit. Turn the cover clockwise about 3/4 to secure the cover back into the unit.



Note: Fuse may blow in order to protect internal damage to the microscope. And in most cases, replacing the fuse with the correct voltage will resolve the issue. However, should you encounter a blown fuse frequently, please contact your distributor for further assistance.

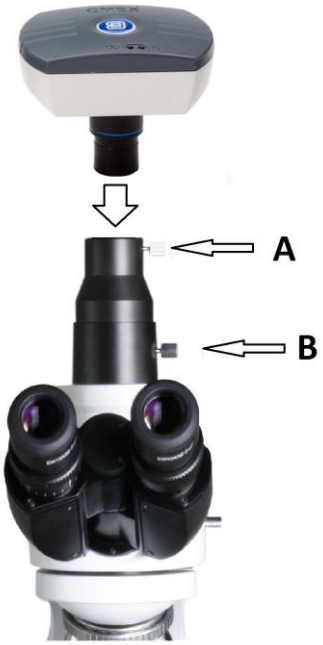
fuse specification: 250V, 150 mA

Digital cameras

Digital cameras are designed to be used on the photo port of the microscope head. It is also possible to use the digital camera in combination with a binocular head. For infinity type iScopes, simple remove the eyepiece[1] and place the 30mm adapter ring into the eyepiece tube[2] then place the camera with mounted c-mount adapter the eyepiece tube[3]. Focus the digital image with the coarse and fine controls of the microscope. For finite(160mm) iScopes the procedure is the same but there is no need to use an eyepiece tube[2].

For trinocular models, slide the camera with mounted c-mount adapter into the 23,2mm tube of the phote port. For focussing slowly unscrew the tube (A) you will be able to match parfocality of the camera with the view through the eyepieces by moving the camera up and down inside the 23,2mm tube. Take an easy-to-view specimen and focus the image through the microscope's eyepieces (with dioptre adjustment set on "0"). Afterwards, perform the height adjustment procedure above while watching the image on the computer screen. In this case, once you have obtained parfocality in the device, tighten screw (A) again. Screw (B) is only used to fix the 23,2mm tube on the iScope's photo port.

Follow the manual that comes with the camera for camera operation.



Trinocular iScope head with camera in photo port

Binocular iScope infinity type head with camera replacing the original eyepiece

Accessories and spare parts

IS.6010 EWF 10x/20 mm eyepiece
IS.6011 EWF 10x/22 mm eyepiece
IS.6099 Pair of eye cups for iScope models

IS.7104 E-plan EPL 4x/0.10 objective
IS.7110 E-plan EPL 10x/0.25 objective
IS.7110 E-plan EPL 20x/0.40 objective
IS.7140 E-plan EPL S40x/0.65 objective
IS.716 E-plan EPL S60x/0.85 objective
IS.7100 E-plan EPL S100x/1.25 objective

IS.8804 E-plan EPLi 4x/0.10 IOS objective, infinity corrected
IS.8810 E-plan EPLi 10x/0.25 IOS objective, infinity corrected
IS.8820 E-plan EPLi 20x/0.40 IOS objective, infinity corrected
IS.8840 E-plan EPLi S40x/0.65 IOS objective, infinity corrected
IS.8800 E-plan EPLi S100x/1.25 IOS objective, infinity corrected

IS.7204 Plan PLi 4x/0.10 IOS objective, infinity corrected
IS.7210 Plan PLi 10x/0.25 IOS objective, infinity corrected
IS.7210 Plan PLi 20x/0.25 IOS objective, infinity corrected
IS.7240 Plan PLi S40x/0.65 IOS objective, infinity corrected
IS.7260 Plan PLi S60x/0.85 IOS objective, infinity corrected
IS.7200 Plan PLi S100x/1.25 IOS objective, infinity corrected

IS.7710 Plan Phase PLPH 10x/0.25 objective
IS.7720 Plan Phase PLPH 20x/0.40 objective
IS.7740 Plan Phase PLPH S40x/0.65 objective
IS.7700 Plan Phase PLPH S100x/1.25 objective

IS.8910 Plan Phase PLPHi 10x/0.25 IOS objective, infinity corrected
IS.8920 Plan Phase PLPHi 20x/0.40 IOS objective, infinity corrected
IS.8940 Plan Phase PLPHi S40x/0.65 IOS objective, infinity corrected
IS.8900 Plan Phase PLPHi S100x/1.25 IOS objective, infinity corrected

PB.5155 Microscope 76 x 26 mm glass slides, edges grinded, packed per 50 pieces
PB.5168 Cover glasses 22 x 22 mm, thickness 0.13-0.17 mm, packed per 100 pieces
PB.5255 Immersion oil n=1.482, 25 ml
PB.5274 Isopropanol 99%, 200 ml cleaning liquid
PB.5245 Lens cleaning paper, 100 sheets

More products can be found on our website.

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