

Levenhuk 320 Series Biological Microscopes

Levenhuk 320 BASE
Levenhuk D320L BASE
Levenhuk 320 PLUS
Levenhuk D320L PLUS

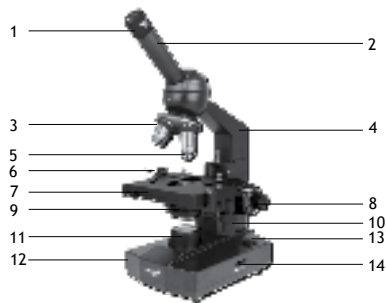


EN	User Manual
BG	Ръководство за потребителя
CZ	Návod k použití
DE	Bedienungsanleitung
ES	Guía del usuario
HU	Használati útmutató
IT	Guida all'utilizzo
PL	Instrukcja obsługi
PT	Manual do usuário
RU	Инструкция по эксплуатации
TR	Kullanım Kılavuzu

Zoom&Joy
Наслади се отблизо
Radost zaostřít
Zoom ran und hab Fun!
Amplie y disfrute
Kellemes nagyítást!
Ingrandisci il divertimento
Radość przybliżania
Dê um zoom na sua emoção
Приближает с удовольствием
Yakınlaştıran ve Keyfini Çıkarın

levenhuk
Zoom&Joy





EN
1 Eyepiece
2 Monocular head
3 Revolving nosepiece
4 Arm
5 Objective lenses
6 Mechanical scale
7 Stage
8 Focus adjustment knob
9 Condenser
10 Coaxial stage control
11 Illumination
12 Base
13 Illumination switch
14 Brightness adjustment wheel

BG
1 Окуляр
2 Монокъларна глава
3 Революерна глава
4 Рамо
5 Обективи
6 Механична скала
7 Предметна маса
8 Бутон за фокусиране
9 Кондензер
10 Коаксиално управление на предметната маса
11 Осветление
12 Основа
13 Превключвател за вкл./изкл. на осветлението
14 Колело за регулиране на яркостта

CZ
1 Okulár
2 Monokulární hlava
3 Otočná hlavice
4 Rameno
5 Objektivy
6 Křížový vodič preparátu
7 Pracovní stolek
8 Šroub ostření
9 Kondenzor
10 Koaxiální regulace pracovního stolu
11 Osvětlení
12 Podstavec
13 Osvětlení - spínač zapnutí / vypnutí
14 Regulátor nastavení jasu

DE
1 Okular
2 Monokularkopf
3 Revolver
4 Stativarm
5 Objektivlinsen
6 Mechanische Skala
7 Objektstisch
8 Fokussierknopf
9 Kondensor
10 Koaxiale Objektstischsteuerung
11 Beleuchtung
12 Mikroskopfuß
13 Beleuchtungsschalter
14 Helligkeitsregler

ES
1 Ocular
2 Cabezal monocular
3 Revólver
4 Brazo
5 Objetivos
6 Micrómetro mecánico
7 Platina
8 Mando de ajuste del enfoque
9 Condensador
10 Control coaxial de la platina
11 Iluminación
12 Base
13 Interruptor de encendido/apagado
14 Rueda de ajuste de brillo

HU
1 Szemlencse
2 Egyszemlencsés fejrézsz
3 Revolverfej
4 Kar
5 Objektívlencsék
6 Mechanikus skála
7 Tárgyasztal
8 Fókuszállító gomb
9 Kondenzor
10 A tárgyasztal koaxiális vezérlése
11 Megvilágítás
12 Talpazat
13 Világítás főkapcsolója
14 Fényerő szabályzókerék

IT
1 Oculare
2 Testata monocularare
3 Revolver porta obbiettivi
4 Stativo
5 Lenti obbiettivo
6 Traslattore meccanico
7 Tavolino
8 Manopola di regolazione della messa a fuoco
9 Condensatore
10 Controllo coassiale del tavolino
11 Illuminazione
12 Base
13 Interruttore illuminazione
14 Rotella regolazione luminosità

PL
1 Okular
2 Głowica monokularowa
3 Miska rewolwerowa
4 Rama mikroskopu
5 Obiektywy
6 Mechaniczna skala
7 Stolik
8 Pokręto regulacji ostrości
9 Kondensor
10 Współosiowy mechanizm regulacji stolika
11 Oświetlenie
12 Podstawa
13 Przełącznik wł./wyt. oświetlenia
14 Pokręto regulacji jasności

PT
1 Ocular
2 Cabeça monocular
3 Revólver giratório
4 Braço
5 Lentes da objetiva
6 Balança mecânica
7 Platina
8 Botão de ajuste da focagem
9 Condensador
10 Controlo coaxial da platina
11 Iluminação
12 Base
13 Interruptor de iluminação
14 Roda de regulação de luminosidade

RU	TR
1 Окуляр	1 Göz merceği
2 Монокюлярная насадка (окулярная трубка)	2 Monoküler başlık
3 Револьверная головка	3 Döner burun parçası
4 Опорная стойка	4 Kol
5 Объективы	5 Objektif mercekleri
6 Препаратоводитель	6 Mekanik ölçek
7 Предметный столик	7 Lamel yuvası
8 Ручка фокусировки	8 Odak ayarlama düğmesi
9 Конденсор с ирисовой диафрагмой	9 Kondansatör
10 Ручка перемещения препарата	10 Eş eksenli lamel yuvası kumandası
11 Подсветка	11 Aydınlatma
12 Основание	12 Taban
13 Кнопка вкл./выкл. подсветки	13 Aydınlatma düğmesi
14 Регулятор яркости подсветки	14 Parlaklık ayarı tekeri

- (EN) Caution:** Please refer to the specifications table for the correct mains voltage and never attempt to plug a 110V device into 220V outlet and vice versa without using a converter. Remember that mains voltage in the U.S. and Canada is 110V and 220-240V in most European countries.
- (BG) Внимание:** моля, вижте в таблицата с техническите спецификации правилното мрежово напрежение и никога не се опитвайте да включите устройство за 110 V в захранващо гнездо за 220 V изход и обратно, без да използвате преобразувател. Не забравяйте, че мрежовото напрежение в САЩ и Канада е 110 V и 220-240 V в повечето европейски страни.
- (CZ) Upozornění:** Správné síťové napětí naleznete v tabulce technických parametrů. Bez použití měniče se nikdy nepokoušejte připojit zařízení dimenzované na napětí 220 V do zásuvky poskytující napětí 110 V a opačně. Mějte na paměti, že síťové napětí ve většině evropských zemí je 220-240 V, zatímco v USA a v Kanadě je to 110 V.
- (DE) Vorsicht:** Die korrekte Netzspannung entnehmen Sie der Tabelle mit den technischen Daten. Schließen Sie ein 220-V-Gerät niemals ohne Spannungswandler an eine 110-V-Steckdose an und umgekehrt. In den meisten europäischen Ländern beträgt die Netzspannung 220-240 V; in den USA und Kanada beträgt sie 110 V.
- (ES) Advertencia:** Consulte en la tabla de especificaciones cuál es la tensión de alimentación adecuada para este instrumento y no intente nunca conectar un aparato de 220 V en un enchufe de 110 V o viceversa sin utilizar un convertidor. Recuerde que la tensión de red en la mayor parte de los países europeos es 220-240 V mientras que en los EUA y Canadá es 110 V.
- (HU) Vigyázat:** Kérjük, a megfelelő feszültséggel kapcsolatban nézze meg a műszaki leírást, és soha ne próbálja meg a 110 V-os eszközöt 220 V-os aljzathoz csatlakoztatni (és fordítva) átalakító használatával. Ne felejtse, hogy az Egyesült Államokban és Kanadában a hálózati feszültség 110 V, míg a legtöbb európai országban 220-240 V.
- (IT) Attenzione:** Per informazioni riguardo la corretta tensione di rete, fare riferimento alla tabella delle specifiche; non cercare assolutamente di collegare un dispositivo a 220 V a una presa di corrente a 110 V e viceversa senza utilizzare un convertitore di tensione. Si tenga presente che la tensione di rete è di 220-240 V nella maggior parte dei paesi europei e di 110 V negli Stati Uniti e in Canada.
- (PL) Uwaga:** Prosimy zapoznać się z tabelą z danymi technicznymi i sprawdzić poprawną wartość napięcia sieciowego. Nie należy podłączać urządzenia o napięciu 220 V do gniazdka o napięciu 110 V ani na odwrót bez użycia przetwornika. Należy pamiętać, że napięcie sieciowe w większości państw europejskich wynosi 220-240 V, natomiast w USA i Kanadzie - 110 V.
- (PT) Atenção:** Lembre-se que a voltagem na maioria dos países europeus é 220-240V. Se você quiser usar seu dispositivo em um país com voltagem padrão diferente, lembre-se que o uso de um transformador é absolutamente necessário.
- (RU) Внимание:** помните, что напряжение сети в России и большинстве европейских стран составляет 220-240 В. Если вы хотите использовать устройство в стране с другим стандартом сетевого напряжения, необходимо включать его в розетку только через соответствующий конвертер (преобразователь напряжения).
- (TR) Dikkat!** Şebeke voltajı birçok Avrupa ülkesinde 220-240 V'dedir. Cihazımızı farklı bir şebeke voltajı standardına sahip bir ülkede kullanacaksanız, dönüştürücü kullanmanın kesinlikle gerekli olduğunu unutmayın.

Never, under any circumstances, look directly at the Sun, another bright source of light or at a laser through this device, as this may cause PERMANENT RETINAL DAMAGE and may lead to BLINDNESS.

General use

Levenhuk 320 series biological microscopes are designed for observations of specimens in the transmitted light. They are used in many scientific fields, including biology, ecology, medicine and veterinary science, as well as for technological research and school presentations.

Microscope parts

Base. It houses the illumination source, electronics, and control mechanisms.

Arm. This piece holds the base, the stage and the head of the microscope together.

Rack-and-pinion mechanism. The stage with the condenser are mounted on the arm and are moving vertically along it. Coarse and fine focus systems provide for smooth vertical movements of the stage. For additional precision, a condenser may be adjusted separately.

Head. A monocular head is mounted at a 45° angle at the upper end of the arm and is 360° rotatable.

Eyepieces and objectives. Consist of lenses that allow magnifying the image. High-quality achromatic objectives with 4x, 10x, 40x and 100x magnifications provide for sharp and bright images. The total magnification is calculated by multiplying the eyepiece magnification to the objective magnification.

Revolving nosepiece. The quadruple revolving nosepiece allows you to change objectives smoothly and easily.

Stage. Sturdy and reliable stage with a specimen holder and mechanical scale can be used to move your slides while observing them. The lower illumination light passes through the opening in the middle of the stage.

Condenser. Abbe condenser, 1.25 N.A. iris diaphragm is a system of lenses located below the stage that allows gathering and directing the light rays.

Focusing knob. A coarse and fine focusing system allows moving the stage up and down adjusting the image sharpness.

Lower illumination. Illumination with adjustable brightness allows observing transparent objects. The illumination system can be powered by batteries or an AC power supply.

Using the microscope

Getting started

- Unpack the microscope and make sure all parts are available.
- Move the stage to the lowermost position using the focusing knob.
- Connect the microscope to AC power using the AC adapter. Levenhuk 320 PLUS microscopes can be operated in standalone mode. To do this, you need to insert the batteries in the battery compartment ensuring to match the proper polarity markings.
- Turn on the illumination or adjust the reflector to evenly illuminate the specimen within the field of view.
- Insert the eyepiece into the eyepiece tube.
- Slowly adjust the illumination brightness, from dark to light. When you finish your observations, always dim the illumination before unplugging the power cable.
- If you need to change the light bulb, unplug your microscope first.

Focusing

- Place a specimen on the stage and fix it with the holders.
- Select the 4x objective rotating the revolving nosepiece.
- Center the observed specimen in the field of view.

- Rotate the focusing knob to slowly raise the stage until the objective is close to the specimen; keep checking the distance between the objective and the object to avoid their contact. CAUTION: The objective should not touch the specimen, otherwise the objective or/and the specimen might be damaged.
- Look through the installed eyepiece and lower the stage slowly rotating the focusing knob until you see the sharp image of the observed specimen.
- Such adjustment protects the frontal lens from contacting the object when you use objectives of other magnifications; though, slight refocusing might be required.
- If the image is too bright, adjust the diaphragm disk until the passing light ray is reduced to a comfortable brightness level. If the image is too dark, increase the light ray.

Selecting the objective

- Start your observations with the lowest magnification objective (4x) and select a specimen segment for detailed research. Then move the specimen to center the selected segment in the field of view, to make sure it keeps centered when the objective is changed to a more powerful one. Once the segment is selected, you should center its image in the microscope's field of view as precisely as possible. Otherwise, the desired segment might fail to center in the field of view of the higher power objective.
- Now you can switch to a more powerful objective by rotating the revolving nosepiece. Adjust the image focus, the iris diaphragm and the illumination brightness if required.
- When using a 100x objective lens, you have to fill the space between the lens and the specimen with immersion oil. There should be no air bubbles in the oil, as they might reduce the resulting quality of the image. **Do not use any substitutes for the immersion oil, as this will significantly reduce the quality of the resulting image.** When you are finished observing, clean the immersion oil with a cloth or filter paper. If the objective lens is stained, you can clean it with a cotton pad dipped in isopropyl alcohol. **Do not apply any excessive pressure, as you may damage the objective lens!**

Digital camera

Levenhuk D320L BASE and D320L PLUS come with a digital camera. The digital camera is installed in the eyepiece tube in place of the eyepiece. It allows you to observe specimens in fine detail and true colors on your PC monitor and save images on the hard drive. Connect the camera to your PC via a USB-cable that also acts as a power cable.

Microscopes specifications

	320 BASE	D320L BASE	320 PLUS	D320L PLUS
Type	biological	biological, digital	biological	biological, digital
Optics material	optical glass			
Head	monocular, inclined at 45°, 360° rotatable			
Eyepiece tube diameter	23.2mm			
Magnification	40-1000x		40-1600x	
Revolving nosepiece	quadruple			
Objective lenses	achromatic 4x/0.1, 10x/0.25, 40x/0.65, 100x/1.25 (oil immersion)			
Eyepieces	WF10x		WF10x with pointer, WF16x with pointer	
Condenser	Abbe N.A. 1.25 with iris diaphragm			
Illumination	halogen lamp 20W, lower illumination with brightness adjustment		LED 0.75W, lower illumination with brightness adjustment	
Focus system	coaxial with coarse (20mm) and fine (0.02mm) adjustment			
Stage	double layer mechanical stage with mechanical scale, 110×125mm			
Body material	metal			
Power supply	110V, 50Hz		110V, 50Hz or three AA batteries	
Filters	blue		blue, yellow, green	
Immersion oil	yes			
Dust cover	yes			
Digital camera	no	yes	no	yes

Digital cameras specifications

	D320L BASE Digital camera	D320L PLUS Digital camera
Max. resolution (for still images)	2048×1536px	
Megapixels	3	3.1
Sensor	1/2.7	1/2
Pixel size	2.2×2.2µm	3.2×3.2µm
Mounting location	eyepiece tube (replaces the eyepiece)	
Image format	*.jpg, *.bmp, *.png, etc.	
Spectral range	380-650nm	400-650nm
Exposure	ERS	
Software image control	image size, brightness	image size, brightness, exposure control
Interface	USB 2.0, 480Mb/s	
System requirements	Windows XP (32-bit), Windows Vista/7/8/10/11 (32-bit or 64-bit), Mac OS X, Linux, CPU IntelCore 2 or above; RAM 2GB, USB port 2.0, CD-ROM	Windows XP (32-bit), Windows Vista/7/8/10/11 (32-bit or 64-bit), Mac OS X, Linux, CPU IntelCore 2 or above; RAM 2GB, USB port 2.0, CD-ROM
USB cable	yes	
Software CD	yes	
Camera adapter	no	yes

The manufacturer reserves the right to make changes to the product range and specifications without prior notice.

Care and maintenance

Never, under any circumstances, look directly at the Sun, another bright source of light or at a laser through this device, as this may cause PERMANENT RETINAL DAMAGE and may lead to BLINDNESS. Take necessary precautions when using the device with children or others who have not read or who do not fully understand these instructions. After unpacking your microscope and before using it for the first time check for integrity and durability of every component and connection. Do not try to disassemble the device on your own for any reason. For repairs and cleaning of any kind, please contact your local specialized service center. Protect the device from sudden impact and excessive mechanical force. Do not apply excessive pressure when adjusting focus. Do not overtighten the locking screws. Do not touch the optical surfaces with your fingers. To clean the device exterior, use only special cleaning wipes and special optics cleaning tools from Levenhuk. Do not use any corrosive or acetone-based fluids to clean the optics. Abrasive particles, such as sand, should not be wiped off lenses, but instead blown off or brushed away with a soft brush. Do not use the device for lengthy periods of time, or leave it unattended in direct sunlight. Keep the device away from water and high humidity. Be careful during your observations, always replace the dust cover after you are finished with observations to protect the device from dust and stains. If you are not using your microscope for extended periods of time, store the objective lenses and eyepieces separately from the microscope. Store the device in a dry, cool place away from hazardous acids and other chemicals, away from heaters, open fire and other sources of high temperatures. When using the microscope, try not to use it near flammable materials or substances (benzene, paper, cardboard, plastic, etc.), as the base may heat up during use, and might become a fire hazard. Always unplug the microscope from a power source

before opening the base or changing the illumination lamp. Regardless of the lamp type (halogen or incandescent), give it some time to cool down before trying to change it, and always change it to a lamp of the same type. Always use the power supply with the proper voltage, i.e. indicated in the specifications of your new microscope. Plugging the instrument into a different power outlet may damage the electric circuitry of the microscope, burn out the lamp, or even cause a short circuit. Children should use the device under adult supervision only. **Seek medical advice immediately if a small part or a battery is swallowed.**

Battery safety instructions

Always purchase the correct size and grade of battery most suitable for the intended use. Always replace the whole set of batteries at one time; taking care not to mix old and new ones, or batteries of different types. Clean the battery contacts and also those of the device prior to battery installation. Make sure the batteries are installed correctly with regard to polarity (+ and -). Remove batteries from equipment that is not to be used for an extended period of time. Remove used batteries promptly. Never short-circuit batteries as this may lead to high temperatures, leakage, or explosion. Never heat batteries in order to revive them. Do not disassemble batteries. Remember to switch off devices after use. Keep batteries out of the reach of children, to avoid risk of ingestion, suffocation, or poisoning. Utilize used batteries as prescribed by your country's laws.

Levenhuk International Lifetime Warranty

All Levenhuk telescopes, microscopes, binoculars, and other optical products, except for their accessories, carry a **lifetime warranty** against defects in materials and workmanship. A lifetime warranty is a guarantee on the lifetime of the product on the market. All Levenhuk accessories are warranted to be free of defects in materials and workmanship for **six months** from the purchase date. The warranty entitles you to the free repair or replacement of the Levenhuk product in any country where a Levenhuk office is located if all the warranty conditions are met.

For further details, please visit: www.levenhuk.com/warranty

If warranty problems arise, or if you need assistance in using your product, contact the local Levenhuk branch.