



Dobsonian telescope

20"Ultra Light Dobsonian Gen II

EN Instruction manual





- FR Si vous souhaitez obtenir plus d'informations concernant ce produit ou rechercher ce mode d'emploi en d'autres langues, rendez-vous sur notre site Internet en utilisant le code QR ou le lien correspondant.
- Bezoek onze internetpagina via de volgende QR-code of weblink, voor meer informatie over dit product of de beschikbare vertalingen van deze gebruiksaanwijzing.
- ¿Desearía recibir unas instrucciones de uso completas sobre este producto en un idioma determinado? Entonces visite nuestra página web utilizando el siguiente enlace (código QR) para ver las versiones disponibles.
- Desidera ricevere informazioni esaustive su questo prodotto in una lingua specifica? Venga a visitare il nostro sito Web al seguente link (codice QR Code) per conoscere le versioni disponibili.



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1 Validity note

This documentation is valid for the products with the following article numbers:

0116950

Manual version: 0820 Manual designation:

Manual 0116950 UL-Dobson-20 en EXPSC v082020a

Always provide information when requesting service.

2 Properties:

- · Open truss tube design in all-aluminium construction
- · Mounting as Dobson system
- · Manufactured in Hungary and Germany
- Fast 20" f3.6 optics with 1800mm focal length
- · Large 120mm secondary mirror
- · Quartz primary and secondary mirrors with test certificate
- · Laser engraved main mirror center marking
- · Low viewing height of only 1.63m at the zenith
- · Extremely high rigidity of the construction
- · Tube structure completely welded without rivets and screws
- · Tube and rocker box completely powder-coated
- · Adjustable main mirror during observation
- · Improved primary mirror cell with precise adjustment mechanism for optics adjustment
- · 5 fans for quick temperature adjustment
- DeLuxe 2.5" HEXAFOC focuser with 1:10 gear reduction and 1.25" adapter
- · 4pcs counter weights with each 1 kg included
- · 8x50 viewfinder with illuminated crosshair included
- · 2 mounting plates with universal viewfinder slot
- Friction adjustment and lateral guidance in the height axis for more precise tracking and individual adjustment options
- · Axle sliding pads made of GRP plastic and Teflon for much more precise and smoother tracking
- Abrasion-resistant powder-coated elevation wheels enable jolt-free positioning and can be stowed in the mirror box
- · Spring loaded fasteners for easier operation and a better fit
- · Precision mechanics for the secondary mirror support
- · Secondary mirror holder with adjustment mechanism along the optical axis
- · 6 large feet for a better stand

3 About this Instruction Manual



NOTICE

These operating instructions are to be considered a component of the device.

Read the safety instructions and the operating manual carefully before using this device.

Keep this instruction manual in a safe place for future reference. When the device is sold or given to someone else, the instruction manual must be provided to the new owner/user of the product.

4 Purpose of use

- This device is not intended for use by persons (including children) with impaired physical, sensory
 or mental abilities, or for lack of experience and/or knowledge, unless they are supervised by or
 have received instructions from a person responsible for their safety on how to use this device.
- · This device is for personal use only.
- · It was developed for observing the night sky.

5 General safety instructions



⚠ DANGER

Risk of blindness!

Never look directly at, or near the sun with this device. There is a RISK OF BLINDNESS!



A DANGER

Danger of suffocation!

Improper use of this product may result in suffocation, especially for children. It is therefore imperative that you observe the following safety information.

- Keep packaging materials (plastic bags, rubber bands, etc.) away from children! There is a DANGER OF CHOKING [These pose a CHOKING HAZZARD]
- This product contains small parts that can be swallowed by children! There is a DANGER OF CHOKING [These pose a CHOKING HAZZARD]



⚠ CAUTION

Fire hazard!

Improper use of this product may result in fire. It is essential that you observe the following safety information in order to avoid fires.

 Do not expose this device - especially the lenses - to direct sunlight! Focusing of sunlight could cause fires.



NOTICE

Danger of material damage!

Improper handling may result in damage to the unit and/or accessories. Therefore, use the device only in accordance with the following safety information.

- Do not disassemble the device! In the event of a defect, please contact the after sales support number listed below.
- · Do not subject the device to excessive vibrations.
- Do not expose carbon fibre components to direct sunlight for long periods of time. Excessive exposure to the sun may damage the material.
- · Do not expose the device to high temperatures and protect it from water and high humidity.



NOTICE

Privacy Protection

Respect the privacy of your fellow human beings - do not look into flats with this device, for example!

6 Parts overview and scope of delivery

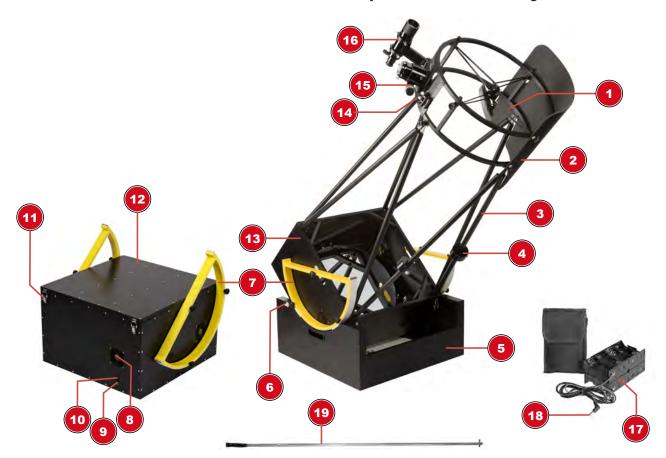


Illustration 1: All parts of the Ultra Light Dobson

1 Secondary mirror cage	2 Stray light shield
3 Tube trusses	4 Counterweight
5 Rocker box	6 Height fixation

7 Elevation wheels	8 Fan
9 DC-in socket	10 On/off switch
11 Tension lock	12 Mirror box lid
13 Mirror box	14 Viewfinder slot
15 Focusing unit with 10:1 gear reduction	16 Viewfinder
17 Battery compartment with carrying bag	18 DC hollow plug
19 Collimation tool	

Scope of delivery:

2 altitude wheels, 1 rocker box, 1 viewfinder 8x50, 1 secondary mirror cage with 2 viewfinder slots and 1 eyepiece extension, 4 pairs of tube trusses, 1 collimation tool, 1 main mirror box with main mirror, 1 stray light shield, 1 assembly set (6 long black knurled screws, 8 black head nuts, 4 corner pieces, 4 short white flat head screws, 2 long white screws), 4 O-rings, 4 counter weights, 1 battery compartment, 1 battery case, 1 focuser extension tube, 1 eyepiece adapter 2.0" to 1.25"

Also required (not included in delivery):

8 x 1.5V batteries type D

7 Choice of location

Select a suitable location before installation and commissioning.

Place the unit on a stable, level and vibration-free surface.

8 Unpack

The contents of the package consist of the various accessories according to the scope of delivery. Remove all parts from the packaging. Check them for completeness.

NOTICE! Remove optical parts with special care! The tissue paper protects the mirror parts from dust. Store protective paper and reuse if stored for a longer period!

9 Assembly of the basic elements

NOTICE! The first assembly should ideally be carried out in a closed, normally tempered room and two persons. For later assembly outdoors and in the dark, a basic knowledge of the individual components and some practice are required.

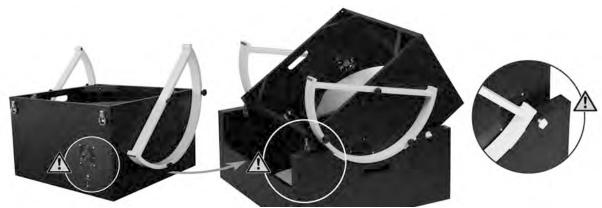


Illustration 2: Mounting the altitude wheels and inserting the main mirror box

- 1. Place the main mirror box horizontally on the floor.
- 2. Open the four tension locks and remove the cover.

3. Screw the two altitude wheels each with three long knurled screws on both sides of the main mirror hox

NOTICE! The mounting can only be done in one possible way with the elevator wheel pointing downwards towards the power connection socket (see detailed illustration).

- 4. After mounting the altitude wheels, place the rocker box on the floor and insert the main mirror box with the side elevator wheels into the rocker box. Make sure that the part of the main mirror box on the sides of which the elevator wheels are not mounted flush with the edge points in the direction of the holes for the side guide screws (see detailed illustration).
- 5. Screw the two white long side guide screws into the threaded holes on the side of the main mirror box so that the main mirror box can be easily moved.
- 6. Unscrew the knob screws in the corners of the main mirror box by a few millimeters and pull off the counter corner pieces on the threaded rods underneath so that there is a gap between the counter corner pieces and the main mirror box.



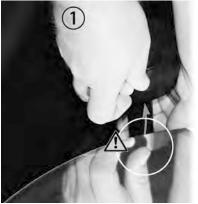
Illustration 3: Mounting the tube trusses

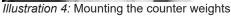
WARNING! Be extremely careful when unscrewing the cap screws and counter corner pieces! They can fall out and damage the main mirror. It is recommended to protect the main mirror from possible damage by means of a suitable cover before mounting.

- 7. Insert a pair of rods into the resulting gap between the counter corner pieces and the main mirror box, then tighten the counter corner pieces with the button screws only slightly at first. Only after mounting the secondary mirror cage (see chapter 'Mounting the secondary mirror cage and adjustment') may the knob screws be tightened by hand.
- 8. Bring the pairs of trusses together at the upper end so that the holes are congruent.
- 9. Place the rubber rings supplied over the upper ends of the rod pairs to hold them together.

WARNING! If necessary, have a second person hold the fixed but still free-standing pairs of rods to prevent damage from falling over.

10 Mounting the counter weights







CAUTION! Be extremely careful when attaching the balance weights. Weights can fall and damage the main mirror! Always transport the balance weights separately from the optics during transport and sufficiently secure them against slipping!

NOTICE! The four balance weights are mounted at different positions. Select only the mounting points described below!

It is recommended to protect the main mirror from possible damage by means of a suitable cover before mounting.

- 1. Put each one counterweight from below onto the short rods in the corners of the mirror box and hand-tighten the fixing screws.
- 2. Slide a further counterweight from above onto each of the two front tube trusses and hand-tighten the fixing screws.

11 Mounting and adjustment of the secondary mirror cage



Illustration 5: Mounting the trusses (left) and adjusting screws (right) on the secondary mirror cage.

NOTICE! All elements of the secondary mirror cage are pre-assembled ex works. Depending on the application, the cage can be mounted in 90° steps. This ensures a comfortable view when pulling or pushing the Dobson telescope. The assembly should ideally be carried out by two persons. Mount the secondary mirror cage taking into account the later position of the eyepiece extension.

- 1. Place two trusses each from opposite pairs of rods on a threaded screw on the secondary mirror cage and tighten with a head nut.
- 2. Tighten the fixing screws only slightly at first and hand tightly only after all rods have been attached.

WARNING! Do not tilt the screws when screwing them in! The screwing in of twisted screws with the use of force leads to damage to the thread in the secondary mirror cage.

- 3. For a subsequent adjustment of the spider-vanes of secondary mirror holder, loosen the lateral fixing screws one after the other slightly.
- 4. Move the secondary mirror spider upwards or downwards until the desired position is reached.
- 5. Tighten the fixing screws by hand.

12 Mounting the stray light shield

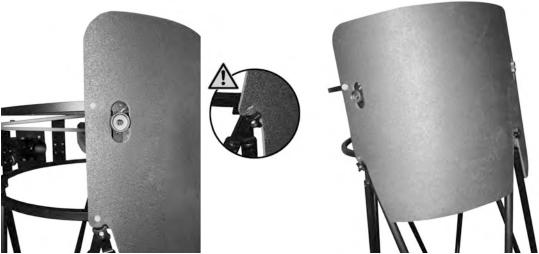


Illustration 6: Mounting the stray light shield

- 1. Place the stray light shield opposite the eyepiece extension with the recesses over the adjusting screws of the secondary mirror cage.
- 2. Screw the stray light shield with the 4 short white flat-head screws to the interception mirror cage.
- 3. Carefully pull the stretchable light shroud* over the boom from the top to the bottom.

Not included in scope of delivery, optionally available

13 Mounting the viewfinder scope

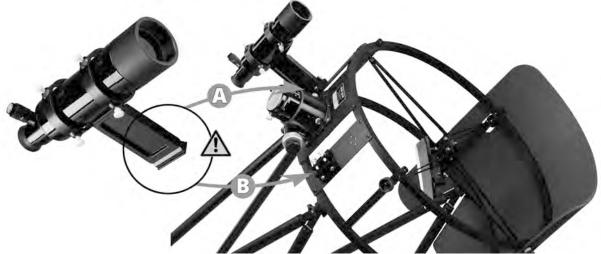


Illustration 7: Mounting the viewfinder scope

NOTICE! The safety mirror cage is equipped with two viewfinder slots (A and B), so that the viewfinder scope can be mounted according to the different viewing position.

- 1. Loosen the fixing screws on the desired viewfinder slot.
- 2. Slide the viewfinder telescope with the guide rail into the desired viewfinder slot (A or B).
- 3. Carefully hand-tighten the fixing screws on the viewfinder slot.

14 Power supply for the fans



Illustration 8: Connecting the Battery Pack

NOTICE! Only use the supplied Battery Pack or a suitable power supply unit (DC 12V) for the power supply!

- 1. Insert 8 x 1.5V type D batteries according to the markings in each battery compartment.
- 2. Plug the hollow DC plug of the battery pack into the corresponding DC-in socket on the back of the main mirror box.
- 3. Move the toggle switch to position 'I' to switch on the fans.
- 4. Move the toggle switch to position '0' to switch off the fans.

NOTICE! Disconnect the power when the fans are no longer needed.

15 Adjusting the viewfinder telescope

- 1. Insert the eyepiece with the longest focal length into the eyepiece socket.
- 2. Target a prominent object (e.g. house gable, church spire, etc.) at a distance of approx. 300 m with the telescope.
- 3. Look through the eyepiece and align the telescope so that the object appears in the center of the eyepiece's field of view.
- 4. Look through the viewfinder telescope and adjust by turning the adjustment screws so that the object is centered in the crosshairs.
- 5. The adjustment of the viewfinder telescope is completed when exactly the same image can be seen through the eyepiece and the viewfinder telescope.



NOTICE

Image inversion

Some viewfinder telescopes have no integrated optical image reversal. This means that the image in the viewfinder telescope is "upside down". However, this is not an error!

16 Adjusting and focusing the eyepiece extension





NOTICE

Do not move the focus wheel beyond the end point when the clamping screw is tightened!

Eyepiece extension and gear parts may be damaged. Loosen the clamping screw before focusing. When the end point is reached (slight resistance when turning), do not turn the eyepiece slide further out.

- 1. Loosen or tighten the adjusting screw in order to make the optimum adjustment for the gear backlash in such a way that a smooth focusing without "slipping" of the eyepiece extension is ensured. Do not overtighten the adjusting screw!
- 2. Tighten the clamping screw to fix the eyepiece extension (e.g. for photographic purposes).
- Loosen the clamping screw to release the eyepiece extension and adjust the focus with the focus wheel.

17 Collimation/adjustment of the optics

This truss tube dobson has a mechanism for the subsequent adjustment of the entire secondary mirror construction. More detailed information can be found in the chapter 'Mounting the secondary mirror and adjustment'.

All Newton telescopes are precisely collimated during the final quality control before shipment. Dismountable telescopes such as a grid tube Dobson, however, usually have to be collimated anew before each use. However, readjusting the optics is quite simple. However, the collimation of a lattice tube Dobson differs from other Newtonian reflector telescopes due to the faster aperture ratio of the main mirror and the advanced adjustment devices for main and secondary mirrors.

It is advisable to collimate the telescope in three steps:

Secondary mirror adjustment

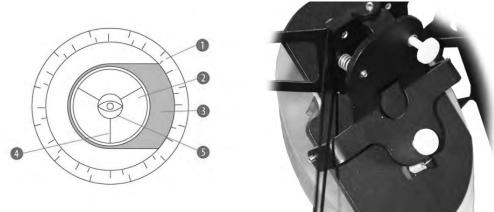


Illustration 9: Mirror adjustment by using the adjustment screws

Let's look at the image in a typical Newtonian reflector telescope with a usual aperture ratio (i.e. a smaller aperture ratio). When the observer looks through the telescope (without eyepiece), the eye of the observer, the secondary mirror, primary mirror and eyepiece extension appear relatively exactly centered in the middle. (see figure 7).

With the fast aperture ratio of Newton telescopes, on the other hand, the secondary mirror must be offset in two directions from the centre: 1. away from the focuser and 2. towards the main mirror (by the same amount).

This so-called "offset" is a few mm in both directions. Remember that these settings were made at the factory before the telescope was shipped. We will only mention it here if you have seen corresponding images on the Internet. For checking and possibly new optical collimation, please proceed as follows:

- Look into the eyepiece drawer without the eyepiece. The secondary mirror appears round and in the middle. If it is not in the center, center it with the two collimation screws on the back of the secondary mirror mount.
- 2. If the reflection of the secondary mirror is not exactly in the center of the primary mirror, adjust the primary mirror with the 3 collimation screws located in the mirror box above or left and right below the primary mirror.

Main mirror adjustment

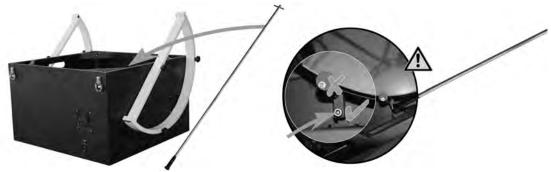


Illustration 10: Main mirror adjustment with collimation tool

If the secondary mirror and the reflection of the primary mirror (2, fig. 7) be centered, but the mirror image of your eye and the reflection of the secondary mirror (5, fig. 7) are not centered, the primary mirror must be adjusted. To do this, insert the supplied adjustment tool over one of the three hexagon socket adjustment screws visible on the side and above the main mirror. If you turn and swivel the adjustment tool a little, you will notice that it will soon snap into the hexagon socket of the screw. Now you can adjust the main mirror by turning the adjustment tool. (See Figure 8) Practice this a little until you get a feel for what a turn of one of the adjustment screws in the eyepiece extension will do. When you have placed the reflection of the eye in the position shown in Fig. 8 the rough adjustment of the telescope is completed.

Fine adjustment



Illustration 11: Fine adjustment Schemata I to III

During the fine adjustment one looks at a bright star with as high a magnification as possible. Allow the telescope to adapt to the ambient temperature for at least 30 minutes so that rising warm air from the mirror does not disturb the star image. If necessary, switch on the fan to support the temperature adjustment. If the telescope is well adjusted, you will see a system of light rings (the so-called diffraction rings) with a bright core (the so-called diffraction disk). From this ring system a cross of 4 bright stripes is emitted, which are caused by light diffraction at the secondary mirror struts.

Probably the telescope will be strongly misaligned at the beginning. You will then see an image in the center of the eyepiece at high magnification as shown in Scheme I.

If you now adjust the primary mirror in the correct direction, the comet's tail on the constellation will become shorter (Scheme II):

When the telescope is precisely adjusted, you will see a symmetrical image (Scheme III):

NOTICE! Outside the center of the image, distortions occur at the star dots of every Newton telescope, which are often superimposed by eyepiece errors in favorable eyepieces. For this reason, it is essential that the polar star is always centered again in the center of the eyepiece field of view after each adjustment change. Because by adjusting the main or secondary mirror the position of the star in the field of vision is changed. In case of strong air turbulence (seeing), the diffraction disk may not be easily recognized. In this case, collimation should take place as far as possible. On such nights it may not be possible to observe high magnifications. Then use the observation time for large objects (e.g. nebulae, star clusters), which can also be observed profitably at low magnification.

18 Star search

In the beginning, orientation in the starry sky is certainly difficult, because stars and star images are always in motion. Their position in the sky changes depending on the season, date and time.

The use of star charts or planetarium software is recommended for orientation. Some of these can be downloaded free of charge from the Internet (e.g. Stellarium). Such planetarium programs show not only the position of star images, but also the positions of planets and so-called deep sky objects (e.g. clusters of stars, galaxies and gas nebulae).

19 Tips and tricks

Image orientation

You will have noticed that objects observed through the telescope appear with left-right reversal and upside down. This is the case with every astronomical telescope for physical reasons and does not play a role in stellar observation. Due to the rotation of the earth, all celestial objects seem to move slowly through the visual field. To compensate for this movement, all you have to do is slowly and evenly adjust the telescope. The higher the magnification, the more practice is required in order to achieve smooth tracking. To compensate, you can also place the object on the eastern edge of the visual field and then observe it at rest with the tube released as it slowly moves through the visual field. Once it has reached the western edge, it is briefly "pushed back" again.

Vibrations

Avoid touching the eyepiece during observation. This or the slight trembling of a hand leads to restless images. If possible, avoid observation sites with ground vibrations (e.g. near railway lines or construction sites)

Dark adaptation

Allow your eyes to get used to the darkness. This dark adaptation lasts about 15 to 20 minutes and starts anew after each - even short - light disturbance. Use a lamp with a red filter, e.g. to read maps or work on the telescope. Weak red light hardly disturbs the dark adaptation of the eyes.

Observations through a window

Observing through a closed window is very unfavourable. The light collected by the telescope must penetrate several layers of glass or air, which leads to considerable image disturbances.

Observation time and magnification

Planets and other objects, when close to the horizon, are strongly influenced by air turbulence and extinction. Here it is always worthwhile to place the observation at a time when they are as high as possible in the sky. Switch to an eyepiece with a lower magnification when the image is flickering or cloudy. Choosing a magnification that is too high is a mistake that is very common in beginners.

Garments

Even in summer it can get very cool on clear nights, especially in the mountains. Take warm clothing such as sweaters, hats, gloves, thicker socks, etc. with you to the observation site. Even in the most beautiful night, observing is no fun when you are cold!

Observation site

Explore their observation site by day. It should be located away from roads and other light sources that would prevent dark adaptation. Fog can often form near rivers or lakes at night. The surface should be firm and relatively level. Although one can also observe from the cities, a place further away is recommendable. Really good sky conditions often only exist about 50 km away from big cities or conurbations. There's an old astronomer's saying: "A dark sky cannot be replaced by anything but a darker sky!"

20 Cleaning and maintenance



NOTICE

Never remove mirror elements!

Correct reassembly without specialist knowledge is not possible. The result is a considerable reduction in optical performance. In this case the warranty claim is void!



NOTICE

Do not use aggressive cleaning agents!

Do <u>not</u> use photographic lens cleaners and <u>no</u> perfume-impregnated, dyed or lotion-soaked cloths to clean optical surfaces. By the use the optics can take permanently damage!

- Protect the device from dust and moisture!
- · Avoid fingerprints and similar contamination of the optical surfaces.
- The residual moisture must be completely degraded before use.
- Do not clean the optics too often! A little dust on the front of the lens or mirror surface will not significantly reduce the image quality. This is no reason for cleaning.
- If necessary, carefully remove dust on the front of the lens or mirror surface with a camel hair brush or blow away with compressed air.
- Remove organic soiling (e.g. fingerprints) with a cleaning liquid (mixing ratio: three parts distilled water, one part isopropyl alcohol). Add a small drop of biodegradable dishwashing detergent per half liter of cleaning liquid. Use soft, white face tissues and carefully clean surfaces with short, radial wiping movements. Replace the tissues as often as possible.

- If the air humidity is high, the glass may fog up and moisture may form. This is not a defect! In this case, allow the device to acclimatise at room temperature for some time so that the residual humidity can be reduced.
- All burnished screws should be treated from time to time with a maintenance oil for metal to avoid the formation of rust film.
- Once the residual moisture has been completely removed, fit the dust caps and store the telescope in a closed container* in a dry, mould-free place. It is recommended to store accessories in a closed container with desiccant.
- (Depending on the model, a case may already be included in the scope of delivery)

21 Technical data

20" Truss-Tube-Dobson

Item number	0116950
Design/Construction	Open truss tube design, cage constructions and tubes made of powder-coated aluminium, 4-arm secondary mirror holder made of steel
Primary mirror	20" (500mm) diameter, parabolic, Quartz glass material, 94% reflectivity
Secondary mirror	120mm diam., Quartz glass material
Focal length	1800mm
aperture ratio	f/3,6
Theor. Theor. resolution power	0.28" (arc-seconds)
Visual limit value	26 mag
Focusing	2.5" HEXAFOC 1:10 focuser, with 1.25" adapter
Mounting	Dobson system
Viewfinder	Optical viewfinder 8x50
OTA weight	42,4 kg
Base weight	10,6 kg
Total weight	53,0 kg

Errors and technical changes excepted.

Service









Bei Fragen zum Produkt und eventuellen Reklamationen nehmen Sie bitte zunächst mit dem Service-Center Kontakt auf, vorzugsweise per E-Mail.

E-Mail: service@explorescientific.de

Telefon*: +49 28 72 80 74 310

Explore Scientific GmbH Kundenservice Gutenbergstr. 2 46414 Rhede Deutschland

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Si desea formular alguna pregunta sobre el producto o alguna eventual reclamación, le rogamos que se ponga en contacto con el centro de servicio técnico (de preferencia por e-mail).

e-mail: servicio.iberia@bresser.de

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