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SCIENTIFIC



Dobsonian telescope ·

10" Truss Tube Dobson

EN Instruction manual

Contents

1	Validity information	4
2	Features	4
3	About this Instruction Manual	4
4	Intended Use	4
5	General safety instructions	5
6	Parts overview and scope of delivery	6
7	Site location	7
8	Unpacking	7
9	Assembling the base elements	7
10	Assembling the brake systems	8
11	Setting up power supply for the fan	8
12	Align the LED viewfinder	8
13	Adjusting the viewfinder	9
14	Adjusting and focusing the eyepiece extension	9
15	Collimating/Adjusting the optics	9
16	Finding a star	11
17	Tips and Tricks	11
18	Calculating the magnification	12
19	Cleaning and maintenance	13
20	Technical data	13

1 Validity information

This documentation is valid for the products with the article numbers listed below:

0116925

Manual version: v0719

Manual description:

Manual_0116925_UL-Dobson-10_en_EXPSC_v072015a

With any service inquiries, please state these information.

2 Features

- Truss tube design in metal and powder coated aluminium
- Dobson mount system
- Parabolic primary mirror made of optical glass material BK-7 with 94% reflectivity
- Improved main mirror cell with precise adjustment mechanism for adjustment of optics, fan system and filter element to protect against dust and dirt included
- DeLuxe 2" HEXAFOC focuser with 1:10 gear reduction and 1.25" adapter
- Deluxe illuminated spot finder included
- Standard viewfinder shoe for easy upgrade to other viewfinder types
- 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 elevator wheels for better durability
- Spring loaded fasteners for easier operation and a better fit
- 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.

Please read the safety instructions and the operating instructions carefully before use.

Keep these instructions for renewed use at a later date. 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 Intended Use

- This device is not intended to be used by persons (including children) with limited physical, sensory or mental capabilities or those who lack the relevant experience and/or knowledge, unless they are supervised by a person responsible for their safety or have received instructions from this person as to how the device is used.
- This device is for private use only.
- It was developed for observing the night sky.

5 General safety instructions



⚠ DANGER

Danger of blindness!

Never use this device to look directly at the sun or in the direct proximity of the sun. There is a risk of BLINDNESS!



⚠ DANGER

Risk of suffocation

Improper use of this product can result in suffocation. This is particularly dangerous for children. The following safety information must be observed at all times.

- Keep packaging materials (plastic bags, rubber bands etc.) away from children. They can cause suffocation.
- This product contains small parts that could be swallowed by children. There is a risk of choking!



⚠ CAUTION

Fire hazard!

In case of any improper use of this device, there is a risk of fire. Therefore please read the safety instructions below to avoid the initiation of burning.

- Do not expose the device - especially the mirror optics - to direct sunlight! The bundling of light could cause fires.



NOTICE

Risk of damage to property

Improper handling can result in damage to the device and/or to the accessories. Always observe the following safety information when using the device.

- Do not disassemble the device. In the event of a defect, please contact the Service Centre in your country (see chapter 'Service').
- Protect the device from severe shocks!
- Do not expose the parts made of carbon to direct sunlight for a longer time. Excessive sun exposure can cause material damages.
- Do not expose this device to higher temperatures and protect it from water and high humidity.



NOTICE

Privacy protection

Please heed the privacy of other people. Do not use this device to look into apartments, for example!

6 Parts overview and scope of delivery

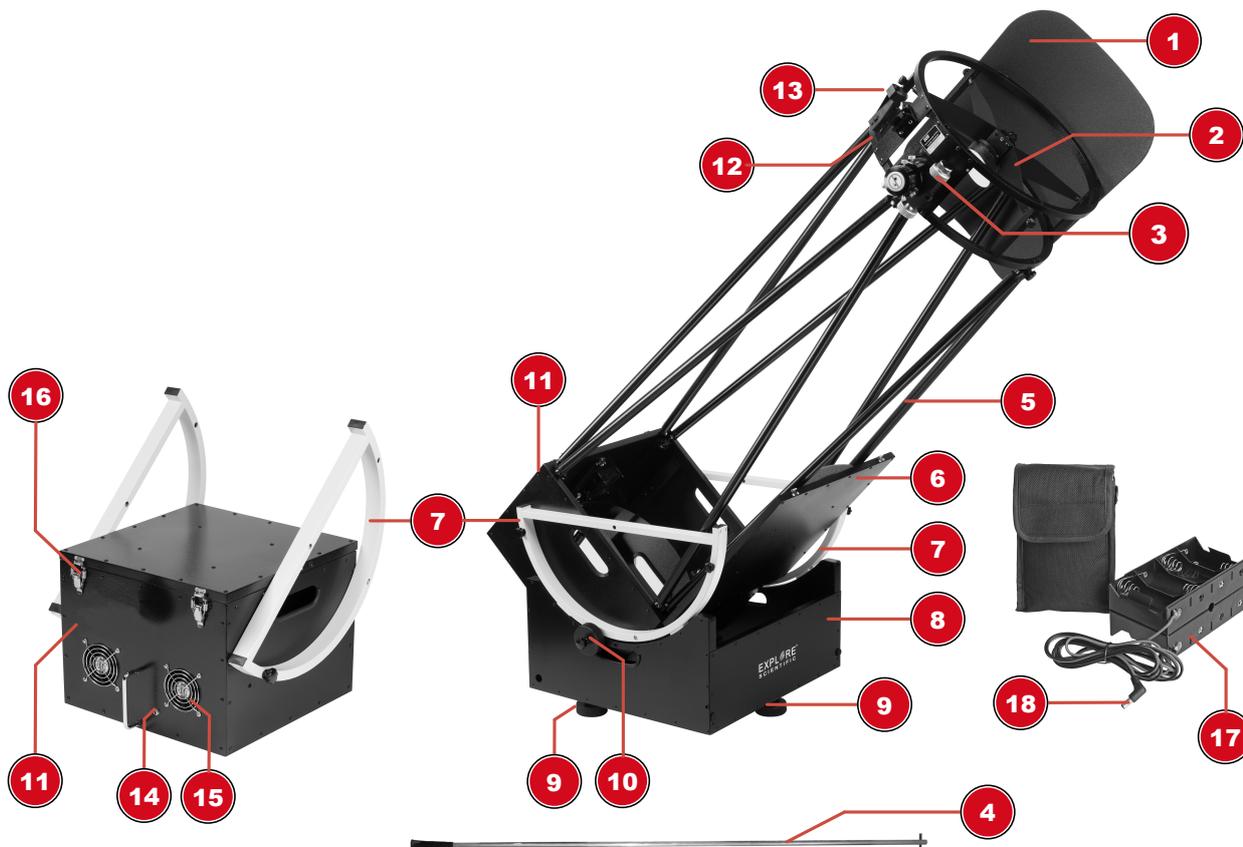


Illustration 1: All parts of the Ultra Light Dobson

1 Stray light shield	2 Secondary mirror cage
3 Focusing unit with 10:1 gear reduction	4 Collimation tool
5 Tube trusses	6 Mirror box lid
7 Elevation wheels	8 Rocker box
9 Pedestals	10 Friction adjustment (brake system)
11 Mirror box	12 Viewfinder holder
13 LED viewfinder	14 DC-in socket
15 Fan	16 Tension lock
17 Battery compartment with carrying bag	18 DC hollow plug

What's Included:

2 altimeter wheels, 1 rocker box, 1 spot finder, 1 safety mirror cage with viewfinder holder and eyepiece extension, 4 tube struts/rod pairs, 1 collimation tool, 1 main mirror box with main mirror, 1 lens shade, 1 screw set (4 short screws, 2 long screws, 2 long thinner screws, 2 long cylinder head screws), 1 hexagon socket wrench, 1 battery pack, 2 brake systems, 4 stands

Also required (not included in delivery):

8 x 1.5V batteries type D

7 Site location

Choose a suitable location before assembly and commissioning.

Place the device on a stable and flat surface, free from vibrations.

8 Unpacking

1. The upper part of the shipping box provides for the pre-assembled struts in pairs and the long collimation tool for the primary mirror (rod with cross handle). Take the accessories out of the box together with the foam parts.
2. Below this a smaller box with the main mirror box and a larger box with the Rockerbox and the secondary mirror cage are placed. The two altitude wheels and the stray light protection are packed sideways. Take the two boxes out of the shipping box and open them. The main mirror box has an inlay that ensures for transport protection and contains other mounting material and accessories.
3. Take the main mirror box out of the box, lift out the inlay and remove the protection paper from the main mirror.
4. Take the secondary mirror cage and the Rockerbox out of the second box and remove the protection paper from the secondary mirror.

NOTICE! The soft tissue paper protects the mirror parts optimally against dust without linting. Store the protection paper and reuse in case of longer storage!

9 Assembling the base elements

NOTICE! The initial assembly should ideally be done in a closed, normally tempered room by two persons. For later installations outdoors and in the dark, a basic knowledge of the individual components and a little practice is required.

1. Place the main mirror box on a horizontally balanced table.
2. Screw the altitude wheels to the main mirror box. To do this, screw each altitude wheel to the main mirror box using one long knurled screw and a cylinder head screw with spacer sleeve each. The cylinder head screws must be inserted into the countersunk holes of the altitude wheels. Use the supplied Allen wrench for mounting. Attach the altitude wheel through the third hole to the unfolded main mirror box covering.

NOTICE! The distance of the holes is similar. However, the kind of the assembly of the two altitude wheels to the main mirror box is not unimportant. On the sides of the mirror box have four holes each with threaded holes. When using large eyepieces, the altitude wheels must always be fastened over the upper two threaded holes. When using smaller 1.25 "eyepieces, the best balance of the telescope is achieved by mounting the wheels over the lower threaded holes. It is recommended to mark the once found combination for re-assembly. For a set-up in the dark, self-luminous stickers or paint markings can be helpful.

3. After assembling the altitude wheels, place the Rockerbox on the ground and insert the main mirror box with the altitude wheels into the Rockerbox.

NOTICE! The main mirror box must be installed so that the fan openings point to the side of the rocker box, which has a deep recess (see detail illustration).

4. Unscrew the head nuts in the corners of the main mirror box to the end of the threaded rods.

WARNING! Do not completely unscrew the head nuts! They can fall out and damage the main mirror.

5. Put one pair of stuts each on one threaded rod and tighten the head nut hand-tight.

WARNING! If necessary, have the fixed but still free-standing pairs of stuts held in place by a second person in order to avoid damage caused by falling over.

6. Screw two studs of opposite pairs of studs each to the secondary mirror cage with short head screws. Tighten the screws only gently and hand-tight after attaching all rods.

WARNING! Do not tilt the screws when screwing in! The insertion of tilted screws with force will cause damage to the thread in the secondary mirror cage.

NOTICE! The assembly should ideally be done by two persons.

7. Attach the stray light protection to the secondary mirror cage using the four Velcro pads.
8. Slide the red dot viewfinder into the viewfinder holder next to the focuser until it clicked into place and secure with the two clamping screws.

10 Assembling the brake systems



Put the completely assembled truss tube into the Rockerbox. Use the long knurled head screws to mount the included brake systems on both sides of the Rockerbox (see detail photo). These serve to improve the lateral guidance and to adjust the friction when using heavy accessories. By tightening and loosening the fixing screw, you can individually adjust the friction resistance of the altitude axis. Make sure that the white Teflon sliding linings exactly run on the yellow wheels.

11 Setting up power supply for the fan

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 into the battery pack compartments as marked.
2. Plug the hollow DC plug of the Battery Pack into the corresponding DC-in socket on the back of the main mirror box. The fans run automatically as soon as the power connection has been established.

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

12 Align the LED viewfinder

The red dot of the viewfinder is visible at its best in the dark. Therefore, the adjustment of the LED viewfinder should be performed then.

1. Insert the battery into the viewfinder.
2. Put an eyepiece with lower magnification into the eyepiece holder.
3. Look through the eyepiece and aim at an object that is at least 800m away (e.g. a street lamp).
4. Look through the viewfinder and move your head back and forth until the luminous dot is centered in front of the semi-transparent mirror surface of the viewfinder.
5. Adjust the viewfinder with the adjusting wheels until the red dot is exactly on the object that was previously selected with the eyepiece.

NOTICE! Additionally, perform this alignment method with a celestial object (such as a bright star or moon) and make any necessary fine adjustments. Proceed as described in step 3.

13 Adjusting the viewfinder

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.

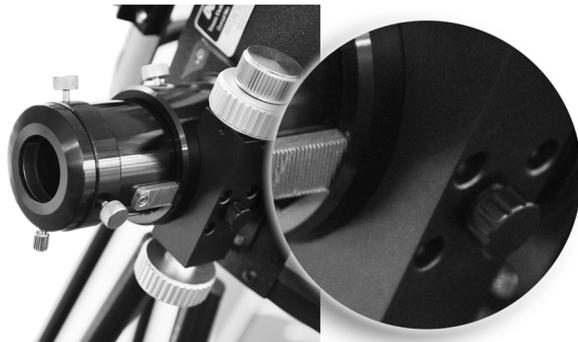


NOTICE

Image reversal

Some viewfinder do not have an integrated optical image reversal. In this case, the image is visible upside down when looking through the viewfinder. This is not an error!

14 Adjusting and focusing the eyepiece extension



NOTICE

Do not turn the focus wheel beyond its end-point and do not turn it when the fixing screw has been tightened!

Eyepiece extension and gear parts can be damaged. Loosen the fixing screw before starting focusing. Do not turn out the eyepiece extension when the end-point has reached (slight resistance will be noticeable).

1. Loosen or tighten the adjustment screw to get the optimal setting for the gear backlash. A smooth focussing without any shaft slipping of the eyepiece extension is recommended. Do not tighten the adjustment screw too firmly.
2. Tighten the fixing screw to fix the eyepiece extension (e.g. for photography).
3. Loosen the fixing screw to unfix the eyepiece extension and adjusting the image sharpness by turning the focus wheel.

15 Collimating/Adjusting the optics

All Newtonian telescopes are precise collimated during the quality control before shipment. However, a telescope that was disassembled (such as an truss tube Dobsonian) need to be newly collimated after reassembly. Collimating a telescope is very simple. However, due to the fast aperture ratio of the main mirror and the advanced collimation unit for primary and secondary mirror, the collimation of the truss tube dobsonians is different to other Newtonian telescopes.

Conveniently, the collimation of the telescope is done in three steps:

Secondary mirror adjustment



Illustration 2: Secondary mirror adjustment with screws

Let's have look at the image in a typical Newtonian reflector telescope with a common aperture ratio (that means with a smaller aperture ratio). When the observer looks through the telescope (without the eyepiece), the observer's eye, the secondary mirror, the primary mirror and the focuser appear to be relatively centered. (see figure 7).

However, with the fast aperture ratio of Newtonian telescopes, the secondary mirror must be offset in two directions from the center: 1. away from the focuser and 2. towards the primary mirror (by the same value each).

This 'offset' is a few millimeters in both directions. Keep in mind that these settings were made in the factory before the telescope was shipped. We only mention it only for the event that you have seen corresponding images on the internet. For checking and possibly new optical collimation please proceed as follows:

1. Look in the focuser without eyepiece. The secondary mirror appears to be round and centered. If it is not centered, adjust it with the three collimation screws on the back of the secondary mirror holder until it is centered.
2. If the reflection of the secondary mirror is not exactly in the center of the main mirror, adjust the main mirror with the 3 collimation screws located above the mirror box or on the left and on the right of the main mirror.

Main mirror adjustment

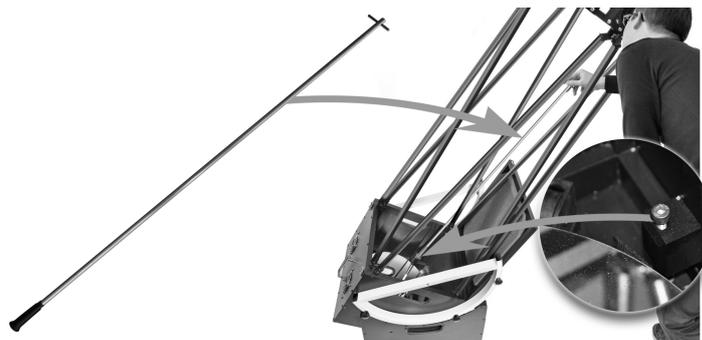


Illustration 3: Main mirror adjustment with a special tool

If the secondary mirror and the reflection of the primary mirror (2, fig. 7) are 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, put the supplied adjustment tool on one of the three hexagon socket adjustment screws that are visible on the side and above the main mirror. If you turn and adjust the adjustment tool a little bit, 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 have a sense what a rotation of one of the adjusting screws causes in the eyepiece. If you have set the reflection of the eye in the position that you can see in figure 8, the coarse adjustment of the telescope is complete.

Fine adjustment

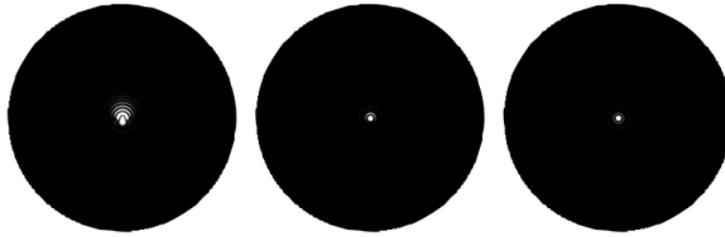


Illustration 4: Fine adjustment: Schemes I to III

During fine adjustment we watch Polaris with high magnification. Please take care that the telescope has time to adapt to the ambient temperature before starting collimation – this will need up to 30 minutes (otherwise you will not get a good star image). You may use the fan to speed up this process. If the telescope is collimated well, you will see a system of dim rings of light surrounding a central bright spot (the so-called airy disc). You will also notice a dim cross of light coming from this airy disc – this is the diffraction that is caused by the secondary mirror struts.

However, the telescope will probably be heavily misadjusted at the beginning. Then you see an image in the center of the eyepiece at high magnification as in scheme I.

If you now turn the main mirror in the right direction, the comet tail of the stellar constellation becomes shorter (scheme II):

When the telescope is precisely adjusted, you will see an symmetric image (scheme III):

NOTICE! Outside the image center, distortions occur at each Newtonian telescope at the star points which are often superimposed by eyepiece errors when using low-cost eyepieces. For this reason it is essential to center Polaris again in the center of the eyepiece's field of view after each adjustment change. Because by adjusting the main or secondary mirror, the position of the star is changed in the field of view. In case of strong air turbulence (Seeing), the diffraction disc may not be well recognized. In this case, extend the collimation as much as possible. It may not be observed at high magnifications during such nights. Then use the observation time for large-scale objects (such as nebulae, star clusters), which can be profitably observed even at low magnification.

16 Finding a star

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 time of year, the date and the time of day.

For orientation it is recommended to use star charts or any sky chart software, some of which can be downloaded free of charge from the internet (e.g. 'Stellarium'). Such kind of computer software shows 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).

17 Tips and Tricks

Image orientation

You may have noticed that objects appear to be upside down and mirrored in your telescope. This is a physical casue in every astronomical telescope and does not cause any problem during astronomical observations. Because of the Earth's rotation all objects seem to drift across the field of view slowly. To compensate this movement you have to move the telescope smoothly and slowly. The higher the magnification the more accurate this tracking movement has to be. Another solution is to place the object on the eastern rim of the field of view and let it drift across the field, an then reposition it on the eastern rim again. However – this method only works with good eyepieces that are able to deliver a sharp image up to the edge of the field of view.

Vibrations

Try not to touch the eyepiece and the OTA during observations. This or the slight shiver of the hand causes unsteady observations. Therefore avoid observation sites with ground vibrations (e.g. close to railway tracks or construction sites)

Dark adaption

Give your eyes some time to adapt to the darkness. This will take about 20-30 minutes after each contact to bright light – even if it is a short contact. Use a dim light with a red filter to read star charts or create drawings of objects – dim red light does not influence the dark adaption very much.

Observations through a window

Observations through a window are very unfavorable (even if the window is open). The light that is gathered by the telescope has to pass a lot of air and glass layers, causing severe image deterioration.

Observation time and magnification

Planets and other objects that are close to the horizon are severely influenced by air movement and absorbance. It is much better to choose your observation time in a way so that those objects are closer to the meridian and on their highest possible position. If the image is dim or moving fast, use a smaller magnification. Using too much magnification is a mistake that is made very often by beginners.

Clothing

Even in the summer clear nights may get very cold, especially in the mountains. Always remember to bring warm clothing like thick jackets, beanies, gloves, winter shoes and thick socks – even if your were sweating during the day. It is hard to enjoy even the best night when you are freezing!

Observing site

Explore your observing site during the day: The ideal site should be far of frequently used streets and other light sources that could prevent your eyes to adapt to the darkness. Keep in mind that it is likely to get foggy in the vicinity of open water, such as river valleys or lakes. The ground should be solid and flat. You can observe in the city, but try to get to a place some distance away, where you can see the milky way if possible. You can get really good conditions about 50 km outside of cities. An old astronomers quote says: 'You can not replace a dark sky by anything other than a more darker sky.'

18 Calculating the magnification

The magnification of a telescope is determined by the focal length of the telescope and the eyepiece focal length. The focal length of the eyepiece is indicated on the case of almost all models.

The magnification changes when the eyepiece is changed.

The respective magnification is calculated using this formula:

Magnification = telescope focal length / eyepiece focal length

Example for a telescope with 1270mm focal length and an eyepiece with 24mm focal length:

Magnification = $1270\text{mm} / 24\text{mm} = 53^*(x \text{ magnification})$

*approximate, mathematical value

The maximum meaningful magnification is approximately twice the value of the objective or main mirror diameter in mm (example for a 10" optical system): $10" = 254 \text{ mm} \times 2 = \text{approx. } 508 \text{ x}$). However, usually lower magnifications produce a more detailed and calm image. Maximum magnifications are only worthwhile with absolutely calm air and some special objects such as double stars. When you start observing a particular object, you should always start at a low magnification. Then center the object in the center of the field of view and focus exactly. Now a higher magnification can be tried. If the image appears restless or blurred, return to the last magnification. Atmospheric conditions vary constantly.

NOTICE! A lower magnification with a sharp image brings more observation fun than an over-enlarged, blurred image.

19 Cleaning and maintenance



NOTICE

Never remove mirror elements!

A correct reassembly without expert knowledge is not possible. A considerable reduction of the optical performance is the result. In this case the warranty claim expires!



NOTICE

Do not use aggressive cleaners!

Do not use photographic lens cleaners and cloths that have been perfume impregnated, coloured or soaked with lotion, to clean any optical surfaces. If using such cleaning agents, the optics can be permanently damaged!

- Protect the device against dust and moisture.
- Avoid putting fingerprints and equal contaminations on any optical surfaces.
- Make sure the residual moisture is fully eliminated before use.
- Do not clean the optics too often! Some dust on the lens frontside or on the mirror surface will not cause any significant differences in the image quality. This is no cause for cleaning.
- If necessary, remove dust on the lens frontside or the mirror surface carefully by using a brush made of camel hair or a bag bellow.
- Remove organic dirt (e.g. fingerprints) by using a special cleaning liquid (mixing ratio: one part of distilled water and one part of isopropyl alcohol). Add a small drop of a biodegradable dishwasher detergent on half a litre of this cleaning liquid. Use soft white towels for facial care and carefully clean the optical surfaces with short circular movements. Exchange the towels more often.
- High humidity can cause the glass to fog up and can lead to local moisture build-up. This is not a defect! In this case let the device acclimatise for a short period of time at room temperature, so that the residual moisture can dissipate.
- After any residual moisture has been degraded, put on the dust protection caps and store the telescope in a closed box* at a dry place that is free of mould. It is recommended to store also the accessories in a closed container with desiccant (bags).
- (*depending on the model a box can be part of the content)

20 Technical data

10" Truss-Tube-Dobson

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	10" (254mm) diameter, parabolic, BK-7 like glass material, 94% reflectivity
Focal length	1270mm
aperture ratio	F/5
Theor. Theor. resolution power	(arcseconds)
Visual limit value	Approximately. 14.5 mag
Focusing	2" HEXAFOC 1:10 focuser, with 1.25" adapter
Mount	Dobson system
Viewfinder	Deluxe Red dot viewfinder
OTA weight	20.0 kg

Base weight	6.4 kg
Total weight	26.4 kg

Errors and technical changes excepted.

Service

DE AT CH BE

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

*Lokale Rufnummer in Deutschland (Die Höhe der Gebühren je Telefonat ist abhängig vom Tarif Ihres Telefonanbieters); Anrufe aus dem Ausland sind mit höheren Kosten verbunden.

GB IE

Please contact the service centre first for any questions regarding the product or claims, preferably by e-mail.

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*Number charged at local rates in the UK (the amount you will be charged per phone call will depend on the tariff of your phone provider); calls from abroad will involve higher costs.

FR BE

Si vous avez des questions concernant ce produit ou en cas de réclamations, veuillez prendre contact avec notre centre de services (de préférence via e-mail).

e-mail: sav@bresser.fr
Téléphone*: 00 800 6343 7000

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*Prix d'un appel local depuis la France ou Belgique

NL BE

Als u met betrekking tot het product vragen of eventuele klachten heeft kunt u contact opnemen met het service centrum (bij voorkeur per e-mail).

e-mail: info@folux.nl
Téléfono*: +31 528 23 24 76

Folux B.V.
Klantenservice Explore Scientific
Smirnofstraat 8
7903 AX Hoogeveen
Nederlands

*Het telefoonnummer wordt in het Nederland tegen lokaal tarief in rekening gebracht. Het bedrag dat u per gesprek in rekening gebracht zal worden, is afhankelijk van het tarief van uw telefoon provider; gesprekken vanuit het buitenland zullen hogere kosten met zich meebrengen.

ES PT

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).

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*Número local de España (el importe de cada llamada telefónica dependen de las tarifas de los distribuidores); Las llamadas des del extranjero están ligadas a costes suplementarios.