



Instruction Manual LightBridge™ Plus Truss Tube Dobsonian Telescopes





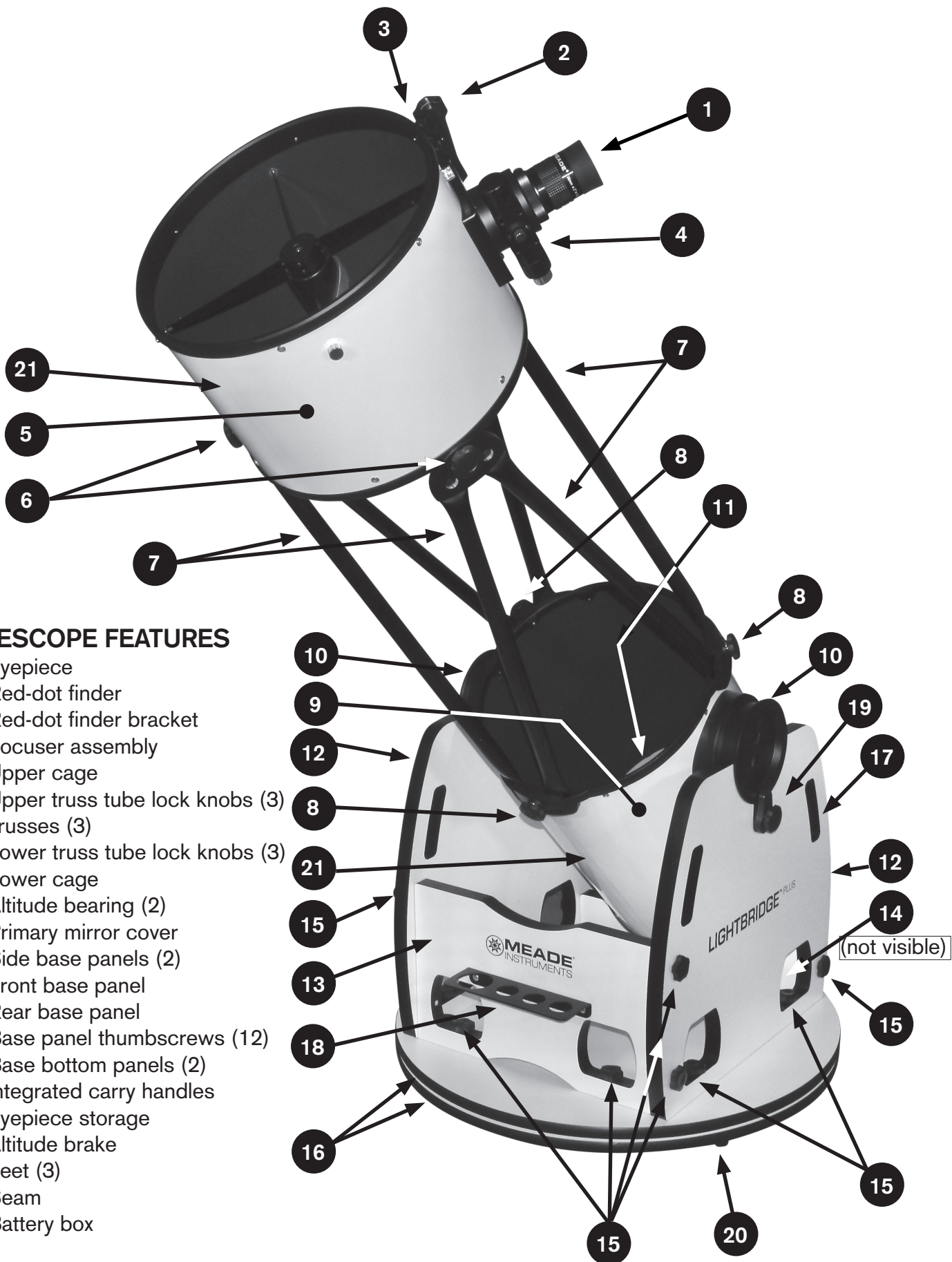
WARNING!

Never use an unfiltered telescope to look at the Sun! Looking at or near the Sun will cause instant and irreversible damage to your eye. Eye damage is often painless, so there is no warning to the observer that damage has occurred until it is too late. Do not point the telescope at or near the Sun. Do not look through the telescope or Viewfinder as it is moving. Children should always have adult supervision while observing.

CONTENTS

LightBridge Plus features	4
Focuser assembly.....	5
Primary mirror assembly.....	5
Azimuth bearing assembly.....	5
Secondary mirror assembly.....	5
Assembling the base	6
Assembling the optical tube	7
The red-dot finder	9
The cooling fan	10
Collimation of the optical system	10
Simplified collimation.....	10
Enhanced collimation.....	12
Aligning the red-dot finder	13
Using the Dobsonian telescope	13
Calculating magnification	14
Observing	14
Some tips	17
Care of the optics	18
Specifications	19
10" LightBridge Plus.....	19
12" LightBridge Plus.....	20
16" LightBridge Plus.....	21
Optional accessories	22
The reflector optical system	23
Meade customer service	24
Meade limited warranty	24
Observing Log	25-27
Social media and address	Back Cover

FIGURE 1: LIGHTBRIDGE PLUS FEATURES



TELESCOPE FEATURES

- 1. Eyepiece
- 2. Red-dot finder
- 3. Red-dot finder bracket
- 4. Focuser assembly
- 5. Upper cage
- 6. Upper truss tube lock knobs (3)
- 7. Trusses (3)
- 8. Lower truss tube lock knobs (3)
- 9. Lower cage
- 10. Altitude bearing (2)
- 11. Primary mirror cover
- 12. Side base panels (2)
- 13. Front base panel
- 14. Rear base panel
- 15. Base panel thumbscrews (12)
- 16. Base bottom panels (2)
- 17. Integrated carry handles
- 18. Eyepiece storage
- 19. Altitude brake
- 20. Feet (3)
- 21. Seam
- 22. Battery box

(not visible)

FIGURE 2: FOCUSER ASSEMBLY

- 23. Coarse focus knob
- 24. Fine focus knob
- 25. Tension knob
- 26. Focuser draw tube
- 27. 2" to 1.25" eyepiece adapter
- 28. Eyepiece lock thumbscrew (1.25" & 2")

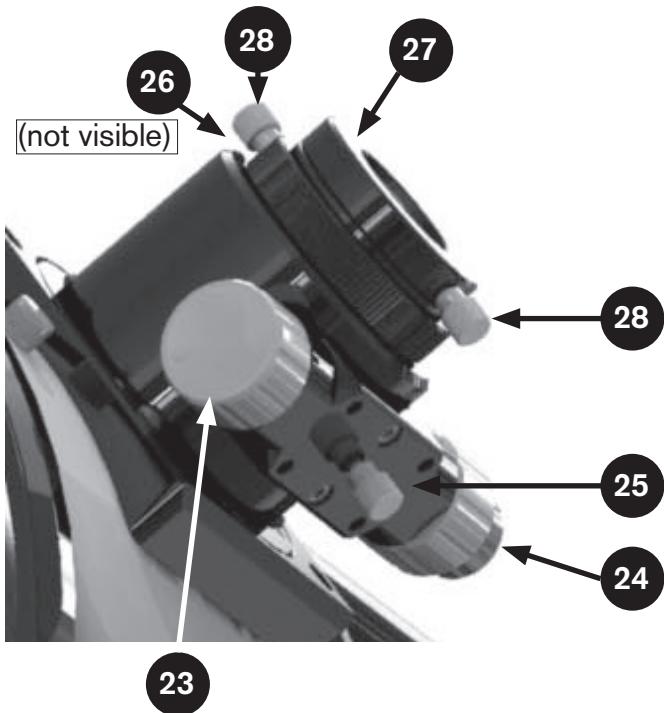


FIGURE 4: AZIMUTH BEARING ASSEMBLY

- 29. Center bearing bushing
- 30. Large roller bearing plates (2)
- 31. Larger roller bearing
- 32. Small roller bearing
- 33. Washers (3)
- 34. Adjustment bolt

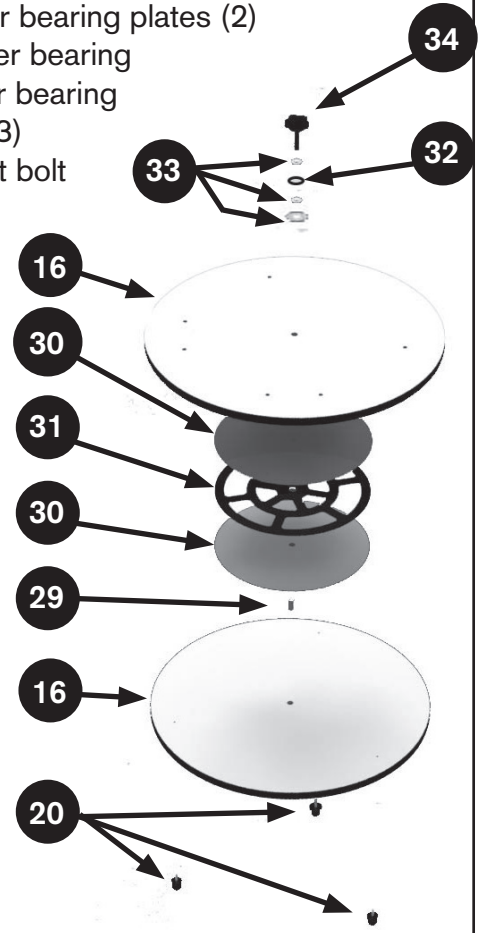


FIGURE 3: PRIMARY MIRROR ASSEMBLY

- 35. Parabolic primary mirror
- 36. Collimation adjustment knobs (with springs)
- 37. Collimation lock knobs (without springs)
- 38. Fan
- 39. Fan power connector

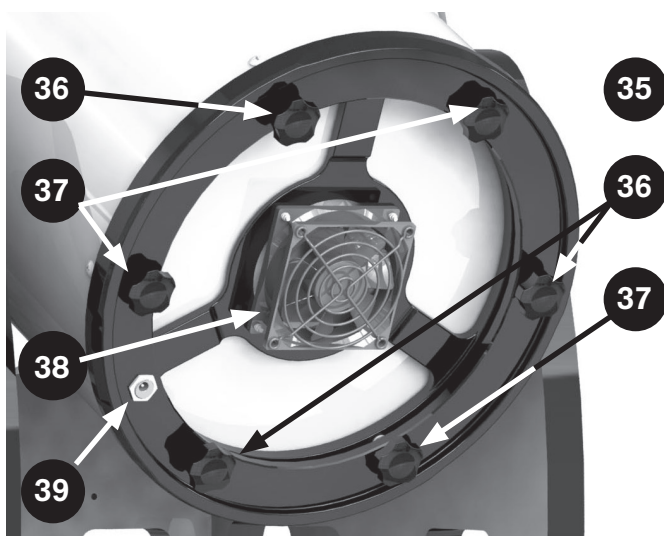
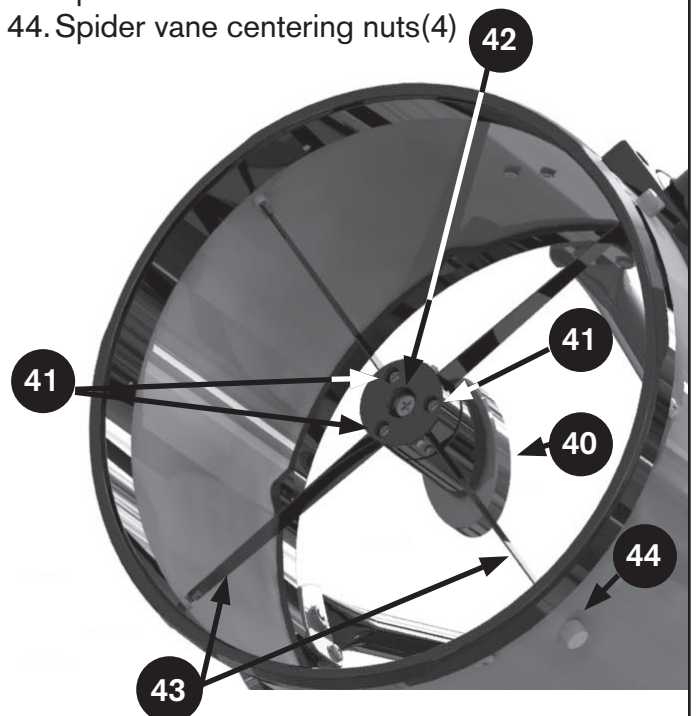


FIGURE 5: SECONDARY MIRROR ASSEMBLY

- 40. Secondary mirror
- 41. Collimation adjustment screws (3)
- 42. Vertical adjustment
- 43. Spider vane
- 44. Spider vane centering nuts(4)



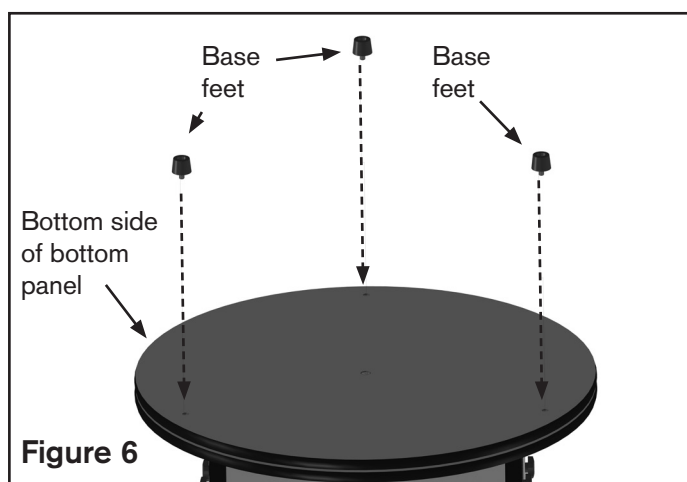
ASSEMBLING THE BASE

Note: The Light Bridge Plus telescope does not require any special tools to assemble. Please follow the directions closely when assembling and disassembling the telescope. The base supports the telescope and allows you to move the telescope from side to side.

Note: Numbers in parentheses. e.g., (9), refer to Figures.1 - 5.

Step 1:

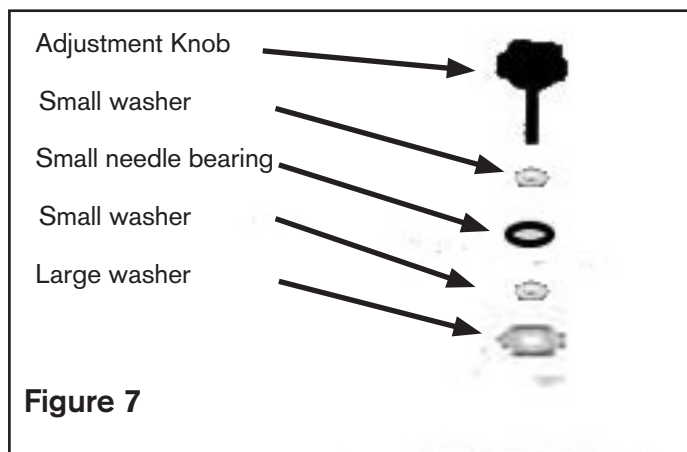
Attach the three feet to the bottom panel (20). Locate the bottom panel which has three threaded holes and thread in each foot into the holes until firm.



Step 2:

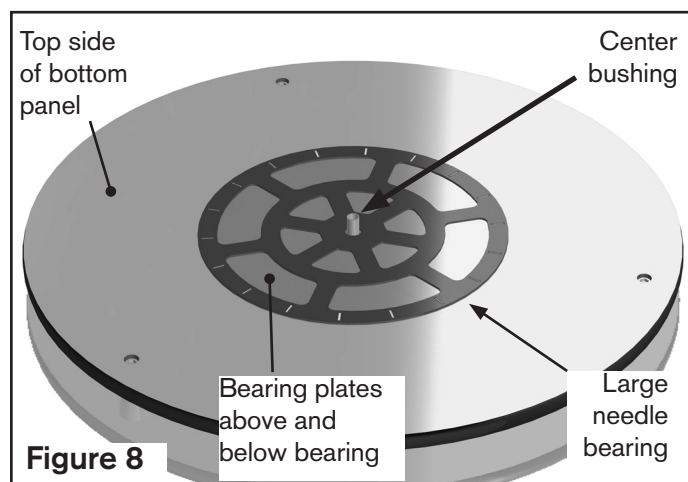
Locate the included hardware pack and set aside the following:

1. Center bearing bushing (29).
2. Two large bearing plates (30) and large needle bearing (31).
3. Small needle bearing (32) with two small and one large washer (33).
4. Azimuth adjustment knob (34)



Step 3:

Place the center bearing bushing (29) into the countersunk hole on the top side of the base bottom panel (16). Slide one of the large roller bearing plates (30) over the center bushing (29) followed by the large roller bearing (31). Place the remaining bearing plate (30) on top of the roller bearing (29). Lastly, place the top panel (16) onto the center busing. The correct orientation of the top panel is with the six threaded holes facing up. See Figure 4.



Step 4:

To secure the azimuth bearing system in place: On the adjustment knob bolt (34), place one small washer (33) on both sides of the small needle bearing (32) followed by the large washer. Slide the adjustment bolt (34) through the top base panel (16) and into the center bushing (29) and hand-tighten. A threaded nut is pre-installed on the bottom plate.

Step 5:

Rotate the circular base panels (16). They should move smoothly and easily without any stiffness. If not, check to make sure the parts were assembled in the correct order and there is nothing preventing the base from rotating freely.

Step 6:

Locate the six pre-drilled holes on the topside of the upper most panel (16). The six holes form a "U" shape and are used to mount the side (12) and front base panels (13) into position.

Step 7:

Locate all 12 base thumbscrews (15) and all four base panels (12-14). Place one of the large side walls (12) onto the base with the LightBridge Plus logo facing outward.

Use two of the thumbscrews (15) to mount the side panel onto the bottom panel. Do not firmly tighten the screws until all the panels have been assembled and loosely connected with the thumbscrews to ensure a proper fit of the panels.

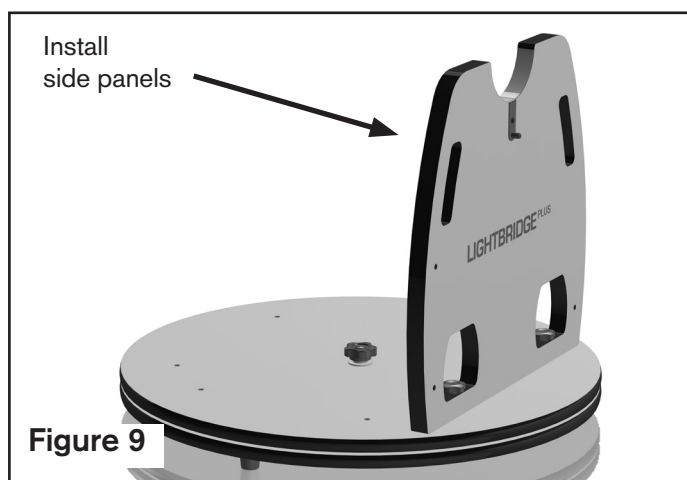


Figure 9

Step 8:

Using the thumbscrews (15) attach the front (13) and remaining side panels (12) to the bottom panel keeping the thumbscrews slightly loose.

Step 9:

Place the small rear base panel (14) between the side panels (12) with the Meade logo facing outward. Now attach the side panels to each other using the included thumbscrews (15) keeping the thumbscrews loose.

Step 10:

Once all the panels are in place, tighten all thumbscrews (15) to a firm feel.

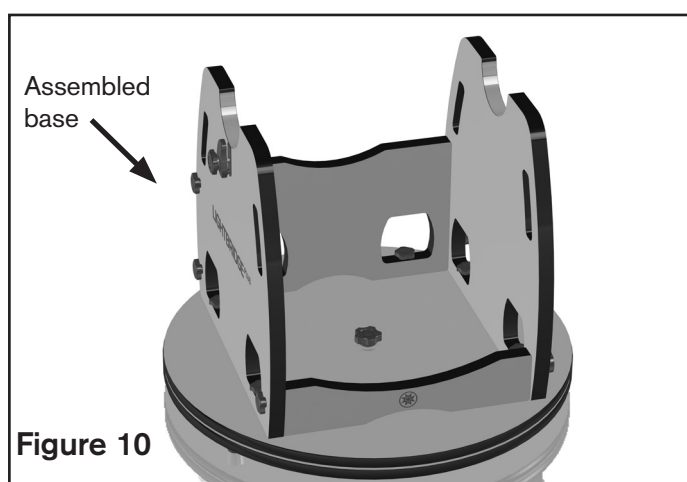


Figure 10

Step 11:

Attach the eyepiece storage tray in place using the two small thumbscrews provided with the tray. The

correct tray orientation is with the screws placed under the tray and out of view.

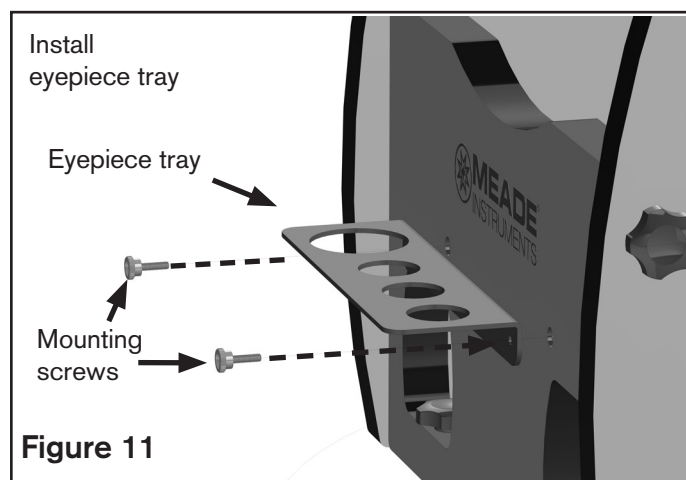


Figure 11

Note: It is not recommended to install the altitude brake (19) until the optical tube lower cage (9) is placed onto the base.

ASSEMBLING THE OPTICAL TUBE

The optical tube is the heart of the telescope and allows distant objects to be viewed up close and in impressive detail. The optical tube is a truss-tube design where an A-frame structure connects the top and bottom parts of the optical tube. To assemble, closely follow the steps below.

Step 1:

Place the lower cage (9) into the base making sure that the altitude bearings (10) fit snugly into the openings on the base side panels. Make sure that the seam (21) of the tube is pointing toward the front base panel (13).

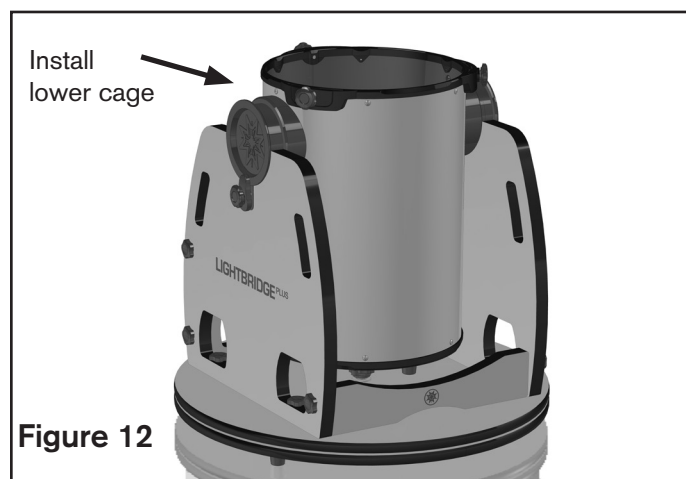


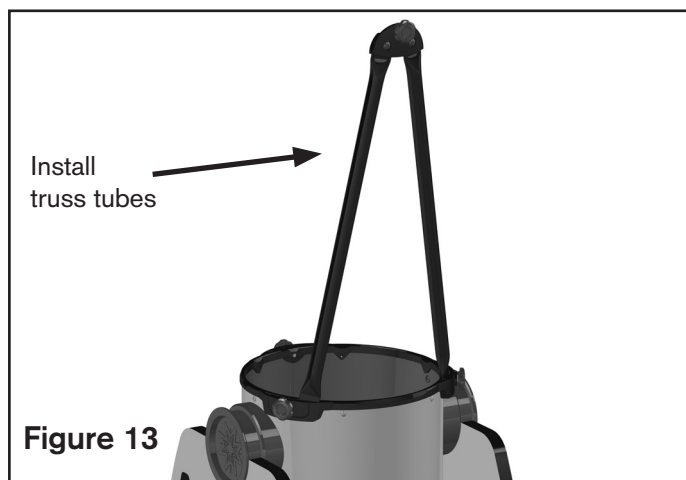
Figure 12

Step 2:

Loosen the three bottom truss-tube lock knobs (8). Place each truss (7) into a set of slots. Lightly

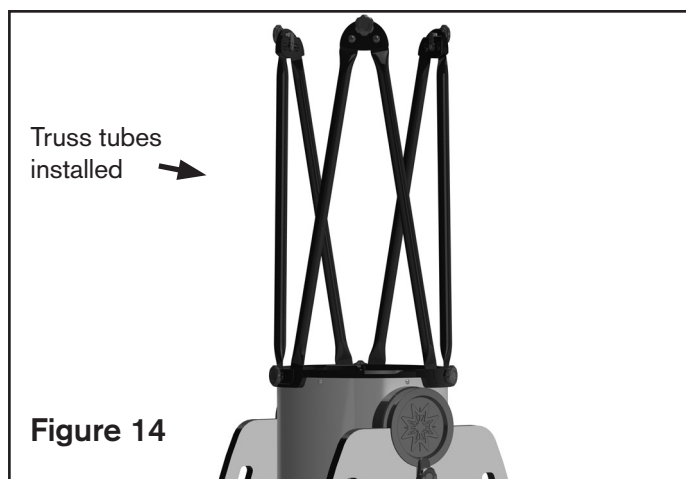
tighten the truss knobs after all three trusses are in place.

Note: Do not fully tighten the truss-tube lock knobs (8) until the upper cage (5) is assembled to ensure all components fit together correctly.



Step 3:

After all 3 trusses are in place, loosen the upper truss-tube lock knobs (6) on top of each truss.

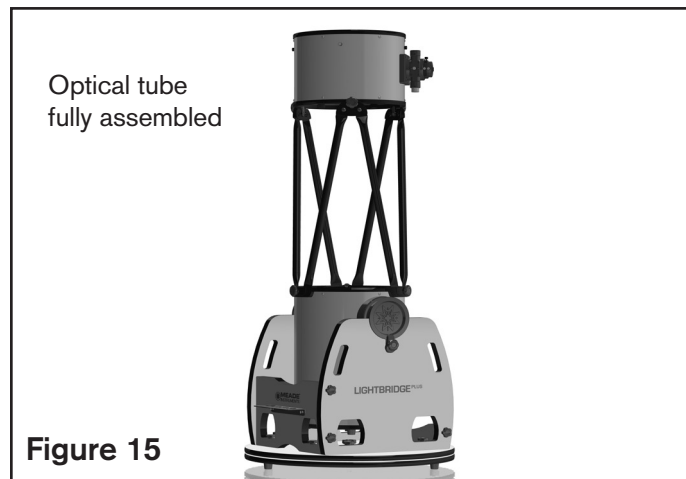


Place the upper cage (5) into the slots at the top of each truss and lightly tighten the truss knobs (6).

Note: Make sure that the seam on the tube is also pointing towards the front panel (see step 1) otherwise the placement of the eyepiece will be in an unacceptable location.

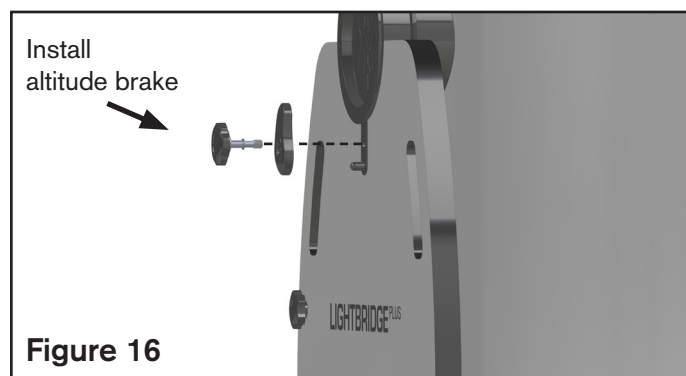
Step 4:

With the upper and lower cages assembled, tighten all six truss-tube lock knobs (8) until firm.



Step 5:

Attach the altitude brake (19) to the left base side panel (12) using the thumbscrew and brake parts provided. The altitude brake can be adjusted as needed to induce additional friction on the altitude motion.



Note: When using heavy eyepieces or accessories, the optical tube balance point changes and may cause the optical tube to drift downward. Tighten the altitude brake (19) to prevent the optical tube from drifting as needed. Do not fully lock the brake where the optical tube can not be easily moved or following stars in the night sky will be difficult.

Before removing or assembling the optical tube, always loosen the altitude brake fully to prevent damage by the altitude bearing (10).

The entire assembly should move easily up and down and from side to side.

Step 6:

Insert the two inch eyepiece (1) into the focuser assembly and tighten the 2" eyepiece lock thumbscrew (28).

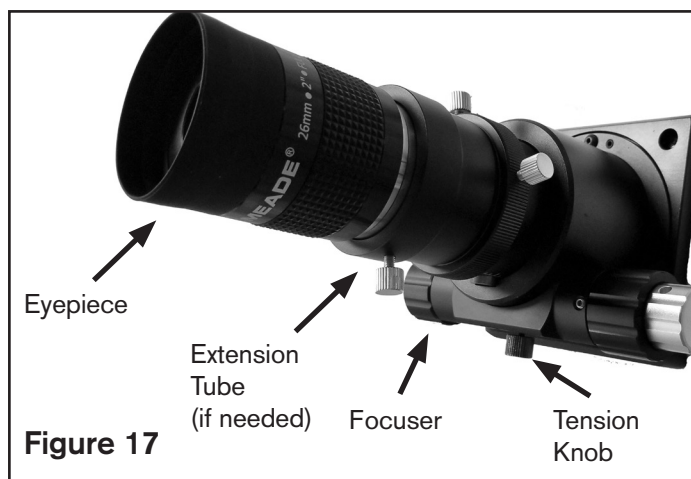
If the 2" to 1.25" eyepiece adapter (27) is

installed, remove it by loosening the eyepiece lock thumbscrews (28) and pulling the adapter out. Set it aside for later use.

To focus the eyepiece, turn the coarse focus knob (23) until the viewed object is in focus. The LightBridge Plus telescope come with a 10:1 fine focus knob that can be used to get your final focus (24) with more precision.

Note: It may be necessary to use the included 2" Extension tube in order to achieve focus. Meade includes this 2" extension tube to allow a wide range of eyepieces to be used with the LightBridge Plus. If when using the telescope you can not achieve focus on a distant target, remove the eyepiece and insert the 2" extension tube directly into the focuser. Then insert the desired eyepiece and adjust focus until the image is sharp.

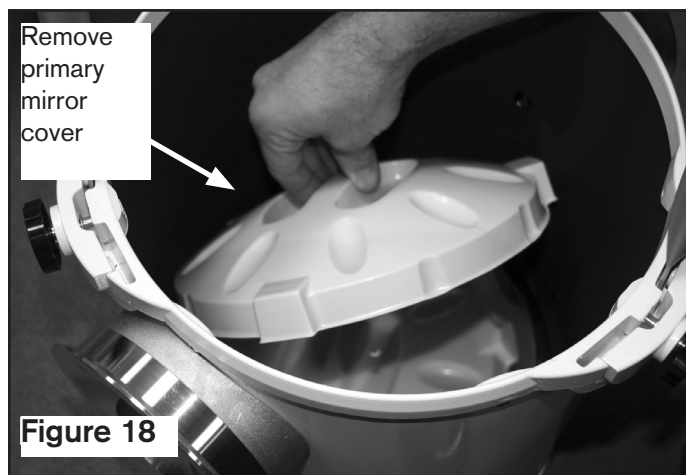
The focuser has a tension adjustment knob (25). This knob can be adjusted to get the ideal feel when turning the focuser knobs and fully tightened to lock the focuser draw tube into position and preventing it from moving in and out. When using heavy eyepieces or accessories it may be necessary to adjust this knob to prevent the focuser draw tube from changing position under the heavy accessory weight.



Experiment with these knobs to discover which adjustments are comfortable with your viewing style.

Step 7:

Lift to remove the dust cover from the primary mirror (11) and set it aside for later use.



THE RED-DOT FINDER

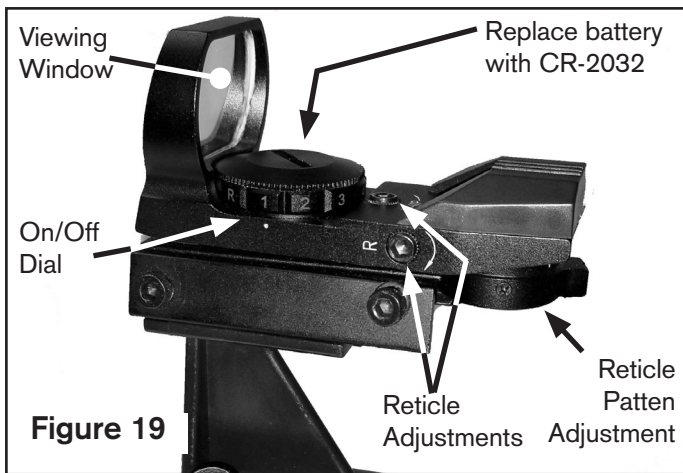
A red dot finder has no magnification and projects a red dot in place of cross-hairs to make it easier to line up the optical tube more precisely with a target. When locating targets, always find them with the red dot first, then look into the eyepiece.

First, assemble the red dot finder. Loosen the two hex head screws on the left side of the finder using the supplied Allen wrench.

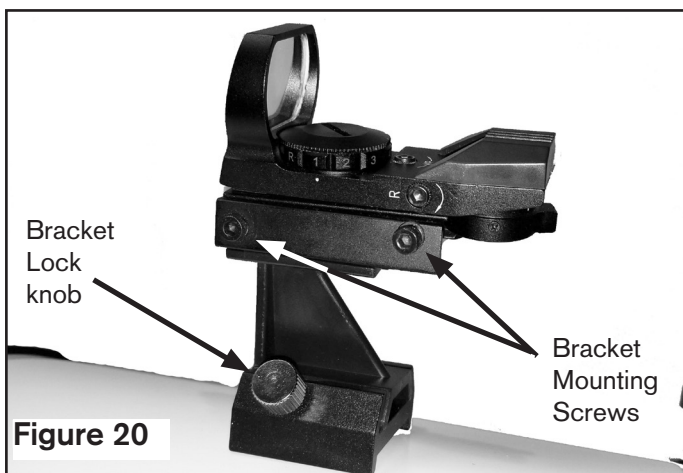
Slide the bracket into the groove at the bottom of the red dot finder and secure the two hex head screws to secure the bracket in place. The proper bracket orientation is with the flat side of the bracket facing forward and placed below the red dot viewing window.

Note: The red dot viewing window is protected by a slip-on rubber cover. Remove the rubber cover before use.

Slide the red dot finder (2) into the mounting bracket (3) on the top upper cage (5). Slide it in from the top (it will only go into the slot from this end). Tighten the thumbscrew to hold the red dot bracket securely in place.

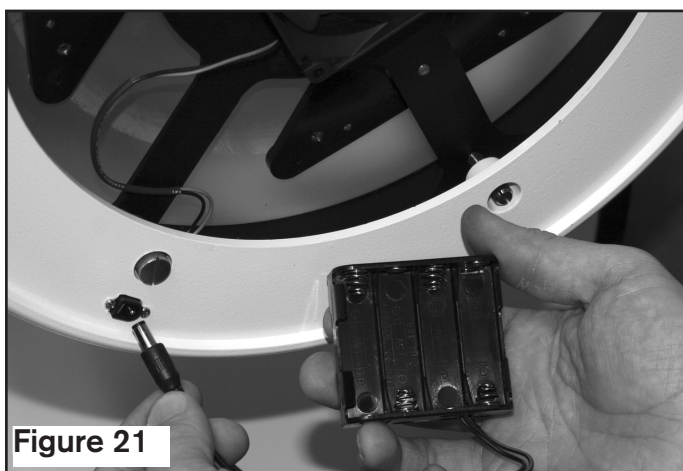


You will need to align the red dot finder. See the section *Aligning the red dot finder* for more information.



THE COOLING FAN

Note that there is a fan (38) mounted on the bottom of the primary mirror assembly. It is powered by a battery pack using 8 AA user-supplied batteries.



If you begin observing at sunset, and the telescope has been heated by the sun or by being in your car, you may notice “turbulence” in your images. In this case, you can run the fan until your images stabilize

and are steady. The fan probably needs to be used less than an hour.

Note also that there are locking and collimation screws for adjusting the alignment of the optics. See Figures 3 & 5. These screws are for use with the collimation procedure described below.

COLLIMATION OF THE OPTICAL SYSTEM

Precise collimation, or alignment, of your telescope's optical system is essential for good performance. All Meade telescopes are accurately collimated at the factory prior to shipment. You may want to collimate after the telescope has been shipped or if it has endured rough handling or a bumpy car journey—usually, though, just a small touch up is all that's required. It is also common to need to re-collimate the telescope after assembly of the telescope to achieve optimal optical performance.

Meade offers an optional laser collimator to help you to collimate your telescope (see *Optional Accessories*). Before your first observing session, take the time now to familiarize yourself with the following collimation procedure so that you may recognize a properly collimated instrument and adjust the collimation yourself, if necessary.

Note: A small paper ring is attached to the primary mirror. This ring was attached at the factory for purposes of laser collimation. The ring will not diminish your telescope's imaging capabilities and does not need to be removed.

SIMPLIFIED COLLIMATION

The optical systems of Newtonian Reflector telescopes include the following parts: primary mirror (1, Fig. 22); secondary mirror (2, Fig. 22); secondary mirror-holder (3, Fig. 22); secondary mirror-vanes (4, Fig. 22); primary mirror-tilt screws (5, Fig. 22). The telescope's image is brought to a focus at (6, Fig. 22).

1. Confirm alignment - To confirm optical alignment look down the focuser draw tube (1, Fig. 25) with the eyepiece removed. The edge of the focuser draw tube frames reflections of the primary mirror (2, Fig. 25), the secondary mirror (3, Fig. 25), the four (“spider”) vanes (4, Fig. 25) (note Figures 25-28 only show three) holding the secondary mirror, and the observer's eye (5, Fig. 25). With the optics properly aligned, all of these reflections appear concentric (centered), as shown in Fig. 28.

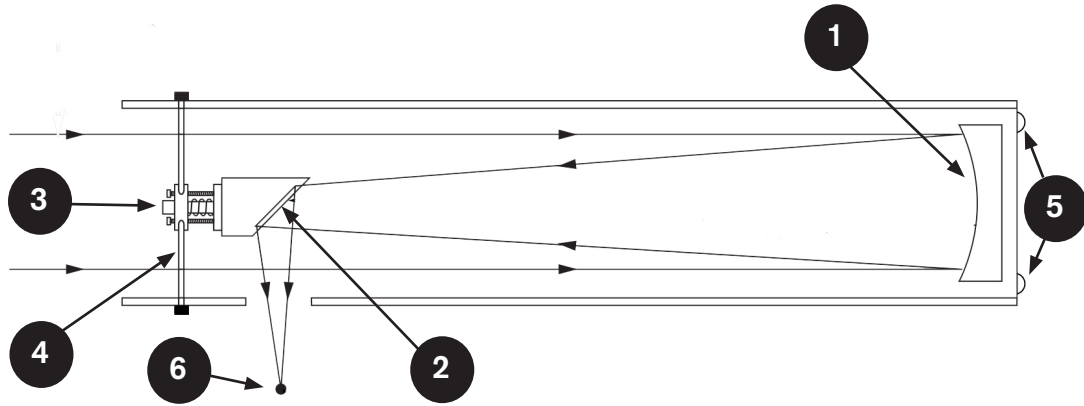


Figure 22 Newtonian Reflecting Telescope

- | | |
|-----------------------------|---------------------------------------|
| 1. Parabolic Primary Mirror | 4. Spider vanes |
| 2. Secondary Mirror | 5. Primary Mirror Adjustments & Locks |
| 3. Secondary Mirror Holder | 6. Focused Image |

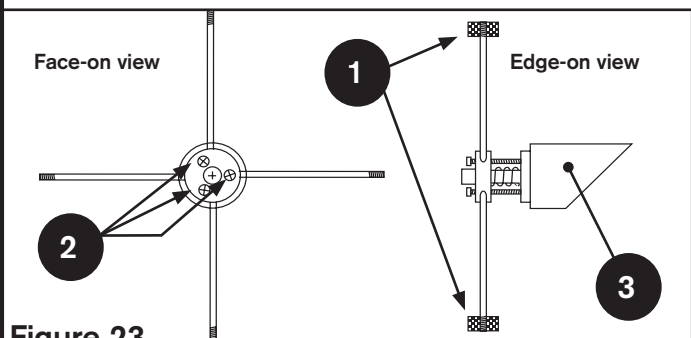


Figure 23

- Secondary Mirror Assembly**
- | | |
|-----------------------------|----------------------------|
| 1. Spider Vanes Adjustments | 3. Secondary Mirror Holder |
| 2. Collimation Screws | |

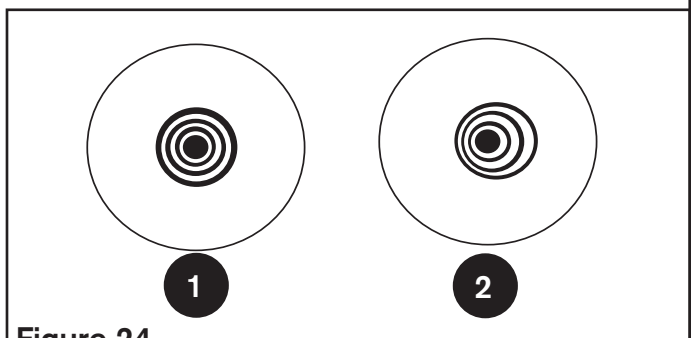


Figure 24

Correct (1) and incorrect (2) collimation as viewed by a star test.

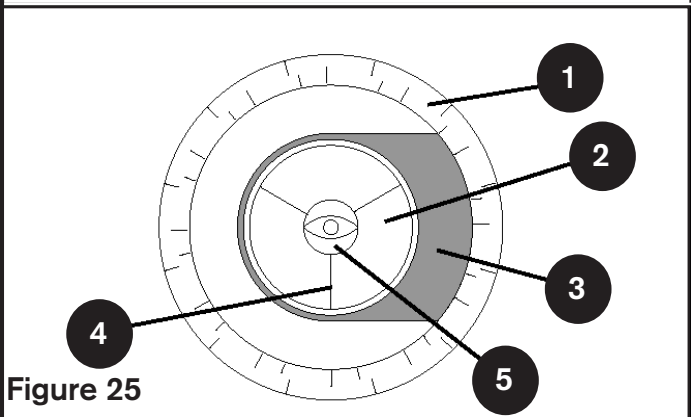


Figure 25

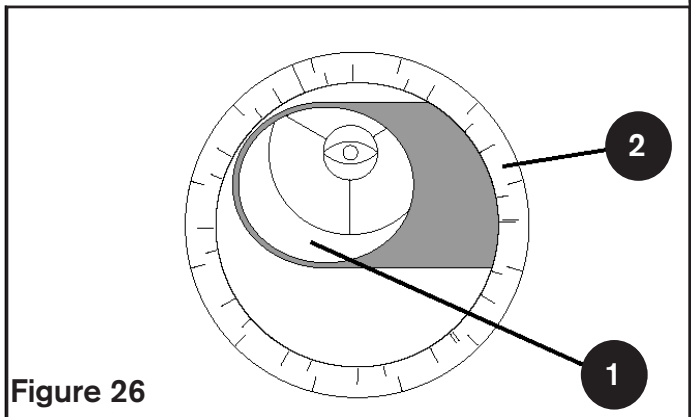


Figure 26

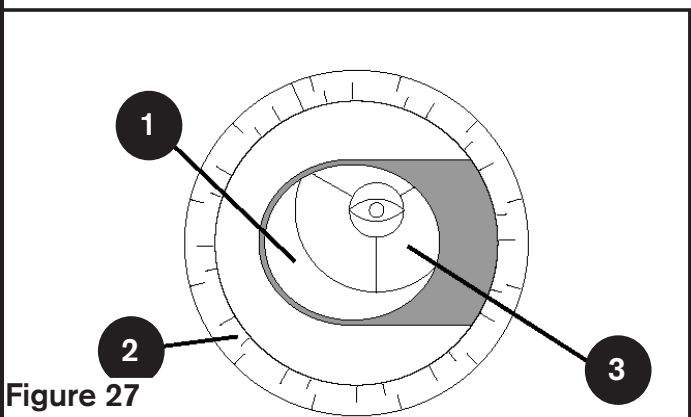


Figure 27

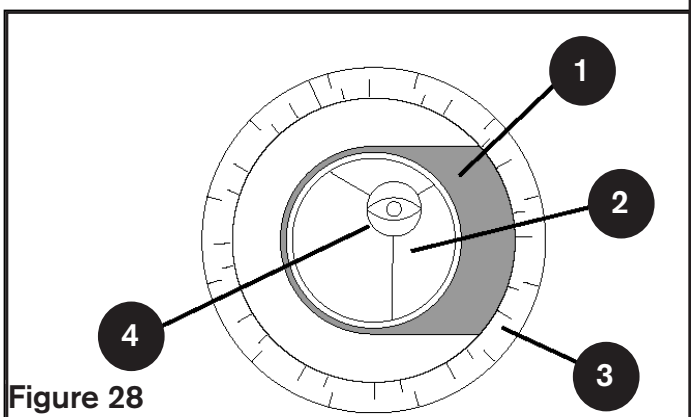


Figure 28

Any deviation from concentricity of any of these telescope parts with the eye requires adjustments to the secondary mirror-holder (Fig. 23) and/or the primary mirror cell (Fig. 24), as described below.

2. Secondary mirror-vane adjustments: If the secondary mirror (1, Fig. 26) is above or below center within the draw tube, thread inward one of the spider vane adjustment/lock knobs (44, Fig. 5) while unthreading the opposite knobs. Only make adjustments to two knobs at a time until the secondary mirror appears as in Fig. 27.

3. Secondary mirror-holder adjustments:

If the secondary mirror (1, Fig. 27) is left or right of center within the draw tube, adjust the center phillips head screw on the secondary mirror holder to move the secondary mirror into position. Do not unthread the center mounting screw too much or the secondary mirror holder can fall off of the spider vanes completely.

If the secondary mirror (1, Fig. 27) is centered in the focuser draw tube (2, Fig. 27), but the primary mirror is only partially visible in the reflection (3, Fig. 27), the three "+" (Phillips head) secondary mirror-tilt screws (2, Fig. 23) should be slightly unthreaded to the point where the secondary mirror-holder (3, Fig. 23) can rotate about its axis parallel to the main tube. Grasp the secondary mirror-holder (avoid touching the mirror surface!) with your hand and rotate it until, looking through the draw tube, you can see the primary mirror centered as well as possible in the reflection of the secondary mirror. With the rotation of the secondary mirror-holder at this best-possible position, thread in the three Phillips head screws (2, Fig. 23) to lock the rotational position. Then, if necessary, make adjustments to these three Phillips head screws to refine the tilt-angle of the secondary mirror, until the entire primary mirror can be seen centered within the secondary mirror's reflection. With the secondary mirror thus aligned the image through the draw tube appears as in Fig. 28.

4. Primary mirror adjustments: If the secondary mirror (1, Fig. 28) and the reflection of the primary mirror (2, Fig. 28) appear centered within the draw tube (3, Fig. 28), but the reflection of your

eye and the reflection of the secondary mirror (4, Fig. 28) appear off-center, then the primary mirror tilt requires adjusting. Use the primary mirror collimation adjustment knobs to tilt the mirror.

Note: Always loosen the collimation lock knobs before adjusting the primary mirror tilt.

The primary mirror-tilt screws are located behind the primary mirror, at the lower end of the main tube. See Fig. 29.

Before adjusting the primary mirror-tilt screws, first unscrew by several turns the three primary mirror lock screws (Fig. 29) which are also located on the rear surface of the primary mirror cell and which alternate around the cell's circumference with the three adjustment knobs. Then by trial and error turn the primary mirror adjustment knobs (Fig. 29) until you develop a feel for which way to turn each knob to center the reflection of your eye in the draw tube.

(An assistant is helpful in this operation.) With your eye centered as shown in Fig. 25, turn the three primary mirror lock knobs (Fig. 29) to re-lock the tilt-angle of the primary mirror. The telescope's optical system is now aligned. This collimation should be checked after each optical tube setup and from time to time, with small adjustments (per steps 1, 2, 3, and/or 4, above) effected as required to keep the optics well-aligned.

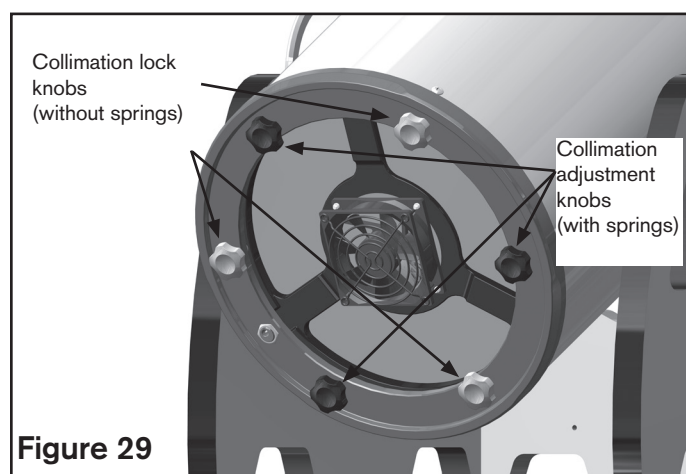


Figure 29

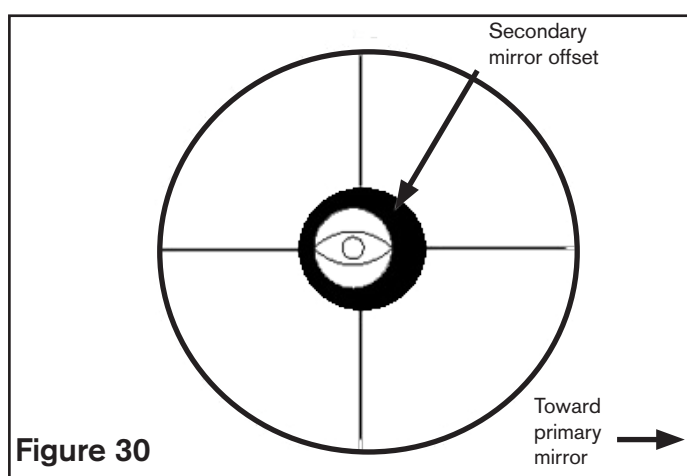
ENHANCED COLLIMATION

An enhanced collimation of the optics can be performed by having the secondary mirror holder offset from its concentric position with respect to the focuser draw tube. The Meade LightBridge Plus is slightly different from that of other Newtonian

reflecting telescopes because of the “fast” f/4.5 to f/5 focal ratio of the primary mirror.

In typical Newtonian reflectors with more conventional focal ratios (i.e. longer focal ratios), when the observer looks down the focuser tube (without an eyepiece in the focuser), the images of the secondary mirror, primary mirror, focuser tube and the observer’s eye appear concentric relative to each other. This is how the collimation was adjusted in the section for the Simplified Collimation described above.

However, with the short focal ratio primary mirror of the LightBridge Plus, true collimation requires that the secondary mirror be offset in 2 directions: (1) away from the focuser and (2) towards the primary mirror, in equal amounts. This offset is approximately 1/8” in each direction. Note that these offsets have been performed at the factory prior to shipment of your telescope. It is only necessary for you to confirm that the telescope has not been badly jarred out of collimation, and to perform the final fine-tuning on an actual star under the night sky. See Figure 30.



ALIGNING THE RED-DOT FINDER

It is recommended that you perform steps 1 and 2 of this procedure during the daytime and step 3 at night.

1. If you have not already done so, place the low-power 26mm eyepiece in the focuser draw tube. (26, Fig. 2) and point the telescope at an easy-to-find land object (e.g., the top of a telephone pole). Turn the focuser knob (23, Fig. 2) so that the image is sharply focused. Center the object precisely in the main telescope’s field of view and keep it centered during the finders alignment procedure.

2. Rotate the dial on top of the finder to change the intensity until you are comfortable with the brightness. Push the lever below the finder to change the shape of the red dot with four different indicator shapes: a dot, a cross, a diamond and a bullseye.

To align the finder, adjust the hex screws on the top and side of the finder with the supplied hex wrench until the finder’s red dot points precisely at the same object as centered in the main telescope. The red dot finder is now aligned to the main telescope.

3. Check this alignment on a celestial object, such as the Moon or a bright star, and make any necessary refinements.



USING THE DOBSONIAN TELESCOPE

1. Your Dobsonian has been designed with some inherent friction. You want the telescope to move easily when you position it, but you also want it to stay in the position you place it. Using any kind of oil, silicone spray, wax, or grease will ruin the performance by causing the telescope to move too easily. Just keep the altitude and azimuth bearing surfaces clean; that’s all the maintenance required.

2. The altitude bearing surfaces (10, Fig 1) of the telescope may become dirty with use. If they do, clean these bearing surfaces with a dry cloth or paper towel. Do not use solvents or alcohol-based cleaning solutions as this may damage the bearings or the painted surfaces of the telescope.

3. You will notice that your telescope will move in altitude by raising and lowering the tube, and in azimuth by rotating the base. As you observe objects in the night sky they will appear to drift out of the field of view due to the Earth’s rotation. To

keep an object centered in the field of view, just lightly nudge the telescope in the proper direction. This may take a little practice at first, but you'll soon get the hang of it.

4. The telescope should be placed on a relatively level surface to allow proper operation. Each of the three feet should be in firm contact and not wobble. If you are in an area with particularly rough or soft ground, it may be helpful to place the Mount on a thick piece of plywood.

5. Part of the fun of using a Dobsonian type of telescope is the challenge of hunting for objects in the night sky. Invest in some simple star charts and books that tell you how to locate objects using a technique called "star hopping." Once you begin learning the star patterns and constellations, you're well on your way to finding many amazing sights.

6. If using heavy eyepieces or accessories, the front of the optical tube may drift downward until the additional weight. Use the altitude brake (19, Fig. 1) to increase the friction on the altitude bearing until the drift is gone. Don't over tighten or the optical tube will be too difficult to track objects in the night sky.

CALCULATING MAGNIFICATION

The magnification, or power of a telescope is determined by two factors: the focal length of the eyepiece and the focal length of the telescope. Your telescope is supplied with one eyepiece. The focal length of the eyepiece, 26mm, is printed on its side.

Telescope focal length is the distance that light travels inside the telescope before reaching a focus.

The focal length of the Dobsonian 10" = 1270mm
 The focal length of the Dobsonian 12" = 1524mm
 The focal length of the Dobsonian 16" = 1829mm

To change magnification, change eyepieces. To calculate the magnification of a given eyepiece, use this formula:

$$\text{Power} = \frac{\text{Telescope Focal Length}}{\text{Eyepiece Focal Length}}$$

Example: Using the 26mm eyepiece supplied with

the 10" f/5 LightBridge Plus telescope, the power is:

$$\text{Power} = \frac{1270\text{mm}}{26\text{mm}} = 49\text{x (approx.)}$$

The type of eyepiece, whether Modified Achromatic, Plössl, or Super Plössl, has no effect on magnification, but does have a bearing on such optical characteristics as field of view, flatness of field, and color correction.

Maximum practical magnification is about 50X per inch of aperture. Generally, however, lower powers produce higher image resolution. When unsteady air conditions prevail (as witnessed by rapid "twinkling" of the stars), extremely high powers result in distorted magnification and observational details are diminished by the use of excessive power.

When beginning observations on a particular object, always start with a low power eyepiece. Center the object in the field of view. Sharply focus the object. Then try using a higher power eyepiece. If the image starts to become fuzzy when you use higher magnification, back down to a lower power. The atmosphere is not sufficiently steady to support high powers. Keep in mind that a bright, clearly resolved, but smaller image will show far more detail than a dimmer, poorly resolved larger image.

OBSERVING

Observe during the daytime: Try out your telescope during the daytime at first. It is easier to learn how it operates and how to observe when it is light.

Pick out an easy object to observe: A distant mountain, a large tree, a lighthouse or skyscraper make excellent targets. Point the optical tube so it lines up with your object.

Use the red dot finder: If you have not done so, align the red dot finder with the telescope's eyepiece as described earlier. Look through the finder until you can see the object. It will be easier to locate an object using the finder rather than locating with the eyepiece. Line up the object with the finder's red dot.

Look through the eyepiece: Once you have the object lined up in the finder, look through the

optical tube's eyepiece. If you have aligned your finder, you will see the object in your eyepiece.

Focus: Look through the eyepiece and practice focusing on the object you have chosen. The focuser has a tension knob (25, Fig. 2) that allows the user to adjust how tight the focuser feels. Experiment with this knob to discover which adjustments are comfortable with your viewing style.

Observe the Moon: When you feel comfortable with the finder, the eyepieces, the locks and the adjustment controls, you will be ready to try out the telescope at night. The Moon is the best object to observe the first time you go out at night. Pick a night when the Moon is a crescent. No shadows are seen during a full Moon, making it appear flat and uninteresting.



Look for different features on the Moon: The most obvious features are craters. In fact you can see craters within craters. Some craters have bright lines about them. These are called rays and are the result of material thrown out of the crater when it was struck by a colliding object. The dark areas on the Moon are called Maria and are composed of lava from the period when the Moon still had volcanic activity. You can also see mountain ranges and fault lines on the Moon.

Use a neutral density filter (sometimes called a "moon filter") when observing the Moon. Neutral density filters are available from Meade as an optional accessory.

Spend several nights observing the Moon. Some nights, the Moon is so bright that it makes other objects in the sky difficult to see. These are nights that are excellent for lunar observation.

Observe the Solar System: After observing the Moon, you are ready to step up to the next level of observation, the planets. There are four planets that you can easily observe in your telescope: Venus, Mars, Jupiter and Saturn.

Nine planets travel in a fairly circular pattern around our Sun. Any system of planets orbiting one or more stars is called a solar system. Our Sun, by the way, is a single, dwarf star. It is average as far as stars go and is a middle aged star.

Beyond the planets are clouds of comets, icy planetoids and other debris left over from the birth of our sun (the Oort cloud). Recently astronomers have found large objects in this area and they may increase the number of planets in our solar system.

The four planets closest to the Sun are rocky and are called the inner planets. Mercury, Venus, Earth and Mars comprise the inner planets. Venus and Mars can be easily seen in your telescope.

Venus is seen before dawn or after sunset, because it is close to the Sun. You can observe Venus going through crescent phases. But you cannot see any surface detail on Venus because it has a very thick atmosphere of gas.

When Mars is close to the Earth, you can see some details on Mars, and sometimes even Mars' polar caps. But quite often, Mars is further away and just appears as a red dot with some dark lines crisscrossing it.

Jupiter, Saturn, Uranus, Neptune and Pluto comprise the outer planets. These planets, except for Pluto, are made mostly of gases and are sometimes called gas giants. If they had grown much bigger, they may have become stars. Pluto is made mostly of ice.

Jupiter is quite interesting to observe. You can see bands across the face of Jupiter. The more time you spend observing these bands, the more details you will be able to see.

One of the most fascinating sights of Jupiter are its moons. The four largest moons are called the Galilean moons, after the astronomer Galileo, who observed them for the first time. If you've never watched the Galilean moons in your telescope before, you're missing a real treat! Each night, the

moons appear in different positions around the Jovian sky. This is sometimes called the Galilean dance. On any given night, you might be able to see the shadow of a moon on the face of Jupiter, see one moon eclipse another or even see a moon emerge from behind Jupiter's giant disk. Drawing the positions of the moons each night is an excellent exercise for novice astronomers.

Any small telescope can see the four Galilean moons of Jupiter, plus a few others, but how many moons does Jupiter actually have? No one knows for sure! Nor are we sure how many Saturn has either. At last count, Jupiter had over 60 moons, and held a small lead over Saturn. Most of these moons are very small and can only be seen with very large telescopes.

Probably the most memorable sight you will see in your telescope is Saturn. Although you may not see many features on the surface of Saturn, its ring structure will steal your breath away. You will probably be able to see a black opening in the rings, known as the Cassini division.



Saturn is not the only planet that has rings, but it is the only set of rings that can be seen with a small telescope. Jupiter's rings cannot be seen from Earth at all—the Voyager spacecraft discovered the ring after it passed Jupiter and looked back at it. It turns out, only with the sunlight shining through them, can the rings be seen. Uranus and Neptune also have faint rings.

Optional color filters help bring out detail and contrast of the planets. Meade offers a line of inexpensive color filters.

What's Next? Beyond the Solar System: Once you have observed our own system of planets, it's

time to really travel far from home and look at stars and other objects.

You can observe thousands of stars with your telescope. At first, you may think stars are just pinpoints of light and aren't very interesting. But look again. There is much information that is revealed in stars.

The first thing you will notice is that not all stars are the same colors. See if you can find blue, orange, yellow, white and red stars. The color of stars sometimes can tell you about the age of a star and the temperature that they burn at.

Other stars to look for are multiple stars. Very often, you can find double (or binary) stars, stars that are very close together. These stars orbit each other. What do you notice about these stars? Are they different colors? Does one seem brighter than the other?

Almost all the stars you can see in the sky are part of our galaxy. A galaxy is a large grouping of stars, containing millions or even billions of stars. Some galaxies form a spiral (like our galaxy, the Milky Way) and other galaxies look more like a large football and are called elliptical galaxies. There are many galaxies that are irregularly shaped and are thought to have been pulled apart because they passed too close to—or even through—a larger galaxy.

You may be able to see the Andromeda galaxy and several others in your telescope. They will appear as small, fuzzy clouds.

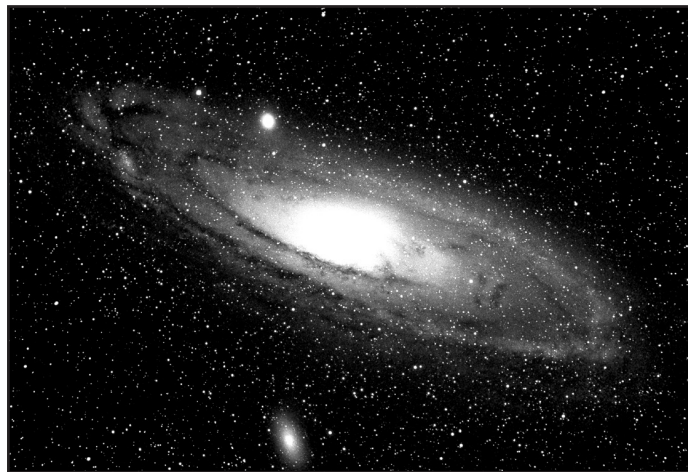
You will also be able to see some nebula with your scope. Nebula means cloud. Most nebula are clouds of gas. The two easiest to see in the Northern Hemisphere are the Orion nebula during the winter and the Trifid nebula during the summer. These are large clouds of gas in which new stars are being born. Some nebula are the remains of stars exploding. These explosions are called supernovas.

When you become an advanced observer you can look for other types of objects such as asteroids, planetary nebula and globular clusters. And if you're lucky, every so often a bright comet appears in the sky, presenting an unforgettable sight.

The more you learn about objects in the sky, the more you will learn to appreciate the sights you see in your telescope. Start a notebook and write down the observations you make each night. Note the time and the date.

Use a compass to make a circle, or trace around the lid of a jar. Draw what you see in your eyepiece inside the circle. The best exercise for drawing is to observe the moons of Jupiter every night or so. Try to make Jupiter and the moons approximately the same size as they look in your eyepiece. You will see that the moons are in a different position every night. As you get better at drawing, try more challenging sights, like a crater system on the moon or even a nebula.

Go your library or check out the Internet for more information about astronomy. Learn about the basics: Light years, orbits, star colors, how stars and planets are formed, red shift, the big bang, what the different kinds of nebula are, what are comets, asteroids and meteors and what a black hole is. The more you learn about astronomy, the more fun, and the more rewarding your telescope will become.



SOME TIPS

By the way, you might have noticed something strange when you looked through your eyepiece. The image is upside down, and it is also reversed. That means reading words can be a problem or viewing objects on the ground can be a problem. But it has no effect on astronomical objects.

Objects move in the eyepiece: If you are observing an astronomical object (the Moon, a planet, star, etc.) you will notice that the object will begin to move slowly through the telescopic field of view. This movement is caused by the rotation of the

Earth and makes an object move through the telescope's field of view. To keep astronomical objects centered in the field, simply move the telescope on one or both of its axes—vertically and/or horizontally as needed. At higher powers, astronomical objects will seem to move through the field of view of the eyepiece more rapidly.

Place the object to be viewed at the edge of the field and, without touching the telescope, watch it drift through the field to the other side before repositioning the telescope so that the object to be viewed is again placed at the edge of the field, ready to be further observed.

Vibrations: Avoid touching the eyepiece while observing through the telescope. Vibrations resulting from such contact will cause the image to move. Avoid observing sites where vibrations cause image movement (for example, near railroad tracks). Viewing from the upper floors of a building may also cause image movement.

Let your eyes "dark-adapt:" Allow five or ten minutes for your eyes to become "dark adapted" before observing. Use a red-filtered flashlight to protect your night vision when reading star maps, or inspecting the telescope. Do not use a regular flash-light or turn on other lights when observing with a group of other astronomers. You can make your own red filtered flashlight by taping red cellophane over a flashlight lens.

Viewing through windows: Avoid setting up the telescope inside a room and observing through an opened or closed window pane. Images may appear blurred or distorted due to temperature differences between inside and outside air. Also, it is a good idea to allow your telescope to reach the ambient (surrounding) outside temperature before starting an observing session.

When to observe: Planets and other objects viewed low on the horizon often lack sharpness—the same object, when observed higher in the sky, will appear sharper and have greater contrast. Try reducing power (change your eyepiece) if your image is fuzzy or shimmers. Keep in mind that a bright, clear, but smaller image is more interesting than a larger, dimmer, fuzzy one. Using too high a power eyepiece is one of the most common mistakes made by new astronomers.

Dress Warm: Even on summer nights, the air can feel cool or cold as the night wears on. It is important to dress warm or to have a sweater, jacket, gloves, etc., nearby.

Know your observing site: If possible, know the location where you will be observing. Pay attention to holes in the ground and other obstacles. Is it a location where wild animals, such as skunks, snakes, etc., may appear? Are there viewing obstructions such as tall trees, street lights, headlights and so forth? The best locations are dark locations, the darker the better. Deep space objects are easiest to see under dark skies. But it is still possible to observe even in a city.

Surf the Web and visit your local library: The Internet contains a huge amount of astronomical information, both for children and adults. Check out astronomy books from your library. Look for star charts—these are available on a monthly basis in *Astronomy and Sky* and *Telescope* magazines.

CARE OF THE OPTICS

Your Meade LightBridge Plus telescope is a fine instrument. With reasonable care, it will last a lifetime.

Maintenance guidelines include:

A. Avoid cleaning the telescope's optics: A little dust on the front surface of the telescope's correcting lens causes virtually no degradation of image quality and should not be considered reason to clean the lens.

B. When absolutely necessary, dust on the mirror should be blown off with an ear syringe (available at any pharmacy). **DO NOT** use a commercial photographic lens cleaner.

C. Organic materials (e.g., fingerprints) on the front lens may be removed with a solution of 3 parts distilled water to 1 part isopropyl alcohol. You may also add 1 drop of biodegradable dish washing soap per pint of solution. Use soft, white facial tissues and make short, gentle strokes. Change tissues often.

Caution: Do not use scented or lotioned tissues or damage could result to the optics.

D. If the telescope is used outdoors on a humid night, water condensation on the telescope surfaces

will probably result. While such condensation does not normally cause any damage to the telescope, it is recommended that the entire telescope be wiped down with a dry cloth before the telescope is packed away. Do not, however, wipe any of the optical surfaces. Rather, simply allow the telescope to sit for some time in the warm indoor air, so that the wet optical surfaces can dry unattended.

E. If your telescope is not to be used for an extended period, perhaps for one month or more, it is advisable to remove the batteries from the fan battery pack. Batteries left in the telescope for prolonged periods may leak, causing damage.

SPECIFICATIONS

10" LightBridge Plus

Optical Design.....	Newtonian reflector
Aperture.....	254mm (10 inches)
Focal Length.....	1270mm (50 inches)
Focal Ratio.....	f/5
Resolving Power.....	0.46 arc-seconds
Limiting Visual Magnitude.....	14.02
Focuser.....	Dual speed 2" rack and pinion with 10:1 fine focus
Red-Dot Finder.....	Deluxe red-dot with variable reticle pattern
Eyepiece.....	2" Meade 26mm Wide Angle Eyepiece
Primary Mirror.....	Parabolic BK7 mirror, Diffraction-limited
Secondary Mirror Support.....	4-vane, steel
Base Assembly.....	No-tool needed assembly, 4-sided structure
Altitude Bearings.....	110mm diameter
Azimuth Bearings.....	Needle bearings
Mount Swivel base	with needle bearings for azimuth
Additional Accessories.....	12v fan with battery pack (user-supplied 8 AA batteries) Eyepiece tray 2 inch extension tube Primary mirror cover Autostar suite DVD
Heaviest Single Component.....	29 lbs.
Assembled OTA weight.....	40 lbs.
Assembled Mount weight.....	31 lbs.
Total assembled telescope weight.....	71 lbs.

SPECIFICATIONS CONT'D

12" LightBridge Plus

Optical Design.....	Newtonian reflector
Aperture.....	305mm (12 inches)
Focal Length.....	1524mm (60 inches)
Focal Ratio.....	f/5
Resolving Power.....	0.38 arc-seconds
Limiting Visual Magnitude.....	14.4
Focuser.....	Dual speed 2" rack and pinion with 10:1 fine focus
Red-Dot Finder.....	Deluxe red-dot with variable reticle pattern
Eyepiece.....	2" Meade 26mm Wide Angle Eyepiece
Primary Mirror.....	Parabolic BK7 mirror, Diffraction-limited
Secondary Mirror Support.....	4-vane, steel
Base Assembly.....	No-tool needed assembly, 4-sided structure
Altitude Bearings.....	130mm diameter
Azimuth Bearings.....	Needle bearings
Mount Swivel base	with needle bearings for azimuth
Additional Accessories.....	12v fan with battery pack (user-supplied 8 AA batteries) Eyepiece tray 2 inch extension tube Primary mirror cover Autostar suite DVD
Heaviest Single Component.....	34 lbs.
Assembled OTA weight.....	45 lbs.
Assembled Mount weight.....	40 lbs.
Total assembled telescope weight.....	85 lbs.

SPECIFICATIONS CONT'D

16" LightBridge Plus

Optical Design.....	Newtonian reflector
Aperture.....	406mm (16 inches)
Focal Length.....	1829mm (72 inches)
FocalRatio.....	f/4.5
Resolving Power.....	0.29 arc-seconds
Limiting Visual Magnitude.....	15.0
Focuser.....	Dual speed 2" rack and pinion with 10:1 fine focus
Red-Dot Finder.....	Deluxe red-dot with variable reticle pattern
Eyepiece.....	2" Meade 26mm Wide Angle Eyepiece
Primary Mirror.....	Parabolic BK7 mirror, Diffraction-limited
Secondary Mirror Support.....	4-vane, steel
Base Assembly.....	No-tool needed assembly, 4-sided structure
Altitude Bearings.....	170mm diameter
Azimuth Bearings.....	Needle bearings
Mount Swivel base	with needle bearings for azimuth
Additional Accessories.....	12v fan with battery pack (user-supplied 8 AA batteries) Eyepiece tray 2 inch extension tube Primary mirror cover Autostar suite DVD
Heaviest Single Component.....	58 lbs.
Assembled OTA weight.....	72 lbs.
Assembled Mount weight.....	72 lbs.
Total assembled telescope weight.....	144 lbs.

OPTIONAL ACCESSORIES

A wide assortment of professional Meade accessories is available for the LightBridge Plus telescope. The premium quality of these accessories is well-suited to the quality of the instrument itself. Visit meade.com for complete details on these and other accessories.

Meade Laser Collimator: The Meade Laser Collimator is an easy to use collimation device. Poor collimation can cause planetary detail to be fuzzy and star images to appear elongated or irregular. The Laser Collimator uses a red laser to accurately align the mirrors in your LightBridge Plus telescope. Once accurately aligned, stars will appear as sharp pinpoints, planets will reveal spectacular detail, and double stars can be easily split. Simply insert the laser collimator into the eyepiece holder of the telescope, and make small adjustments to the secondary and primary mirror to center the red dot of the laser. Once centered your telescope is in collimation and ready to use.

Meade LightBridge Plus Light Shroud: For the best contrast possible it is essential to block all stray light from entering the optical tube. With an open truss-tube design this is difficult to do without the use of a light shroud. Meade's Lightbridge Plus light shroud is available for all sizes of LightBridge Plus telescopes and includes an easy to use Velcro attachment method for easy installation.

Meade Series 4000™ Eyepieces: You want to select an eyepiece that not only gives you the magnification that you want, but also give you the eye relief you need. Other qualities to look for with eyepieces are the apparent field size, which is how large an object looks in an eyepiece, and coatings, which increase contrast in an image. Meade's

Series 4000 & 5000 eyepieces incorporate all the features that you'd want in a set of high quality eyepieces. It is recommended that observers have two or three low and high power eyepiece on hand such as a 9mm, 12mm, and 40mm, in addition to the supplied 26mm. And remove the 1.25" eyepiece holder and your LightBridge Plus is ready to use 2" diameter eyepieces.

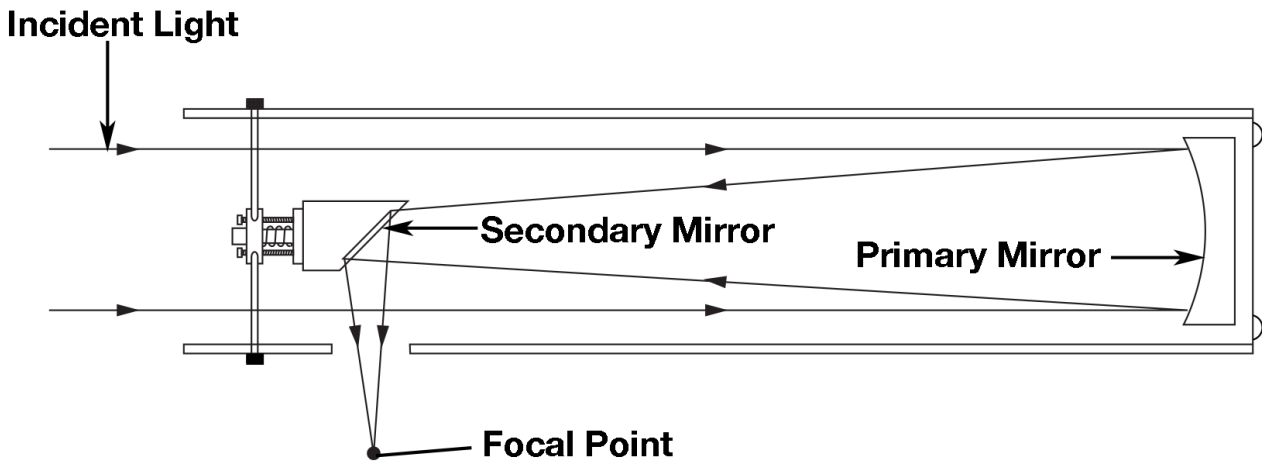
Series 4000™ 8 - 24mm Zoom Eyepiece: The internal zoom optics of this eyepiece move on smooth, precisely machined surfaces which maintain optical collimation at all zoom settings. A scale graduated in 1mm units indicates the zoom focal length in operation. An excellent addition to any eyepiece set.

Series 4000™ Photo-Visual Color Filter Sets: Color filters significantly enhance visual and photographic image contrast of the Moon and planets. Each filter threads into the barrel of any Meade 1.25" eyepiece, and into the barrels of virtually all other eyepiece brands as well. Meade filters are available in several sets and are ideal for lunar and planetary applications, and in Neutral Density as a lunar glare-reduction filter.

More accessories will soon be available for your LightBridge Plus telescope. To find out more about these and other accessories available for your telescope, check out meade.com or contact your local Meade dealer. Also check out Meade's latest ads in Sky and Telescope and Astronomy magazine.



THE REFLECTOR OPTICAL SYSTEM



Reflector telescopes, also referred to as Newtonian Reflectors, crediting Isaac Newton for the invention of this telescope type, uses a concave primary mirror to gather light to a point of focus. All LightBridge Plus Newtonian reflectors use a parabolic-figured mirror, which corrects for spherical aberration inherent in other more standard reflector types that use a spherical mirror. The secondary mirror is a flat optical surface that directs the focal point to the side of the optical tube where the focuser and eyepiece are located. The design is simple, efficient, and often the most economic choice for larger aperture instruments.

MEADE CUSTOMER SERVICE

If you have a question concerning your LightBridge Plus telescope, contact the Meade Instruments Customer Service Department at (800) 626-3233. Customer Service hours are 8:00 AM to 4:00 PM, Pacific Time, Monday through Friday. In the unlikely event that your LightBridge Plus telescope requires factory servicing or repairs, call the Meade Customer Service Department first, before returning the telescope to the factory, giving full particulars as to the nature of the problem, as well as your name, address, and daytime telephone number. The great majority of servicing issues can be resolved by telephone, avoiding return of the telescope to the factory. If factory service is required, you will be assigned a Return Goods Authorization (RGA) number prior to return.

MEADE LIMITED WARRANTY

Every Meade telescope and telescope accessory is warranted by Meade Instruments Corp. ("Meade") to be free of defects in materials and workmanship for a period of ONE YEAR from the date of original purchase in the U.S.A. and Canada. Meade will repair or replace a product, or part thereof, found by Meade to be defective, provided the defective part is returned to Meade, freight-prepaid, with proof of purchase. This warranty applies to the original purchaser only and is non-transferable. Meade products purchased outside North America are not included in this warranty, but are covered under separate warranties issued by Meade international distributors.

RGA Number Required: Prior to the return of any product or part, a Return Goods Authorization (RGA) number must be obtained from Meade by writing, or calling (800) 626-3233. Each returned part or product must include a written statement detailing the nature of the claimed defect, as well as the owner's name, address, and phone number.

This warranty is not valid in cases where the product has been abused or mishandled, where unauthorized repairs have been attempted or performed, or where depreciation of the product is due to normal wear-and-tear. Meade specifically disclaims special, indirect, or consequential damages or lost profit which may result from a breach of this warranty. Any implied warranties which cannot be disclaimed are hereby limited to a term of one year from the date of original retail purchase.

This warranty gives you specific rights. You may have other rights which vary from state to state.

Meade reserves the right to change product specifications or to discontinue products without notice.

This warranty supersedes all previous Meade product warranties.

OBSERVATION LOG

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OBJECT NAME: _____

DATE & TIME OBSERVED: _____

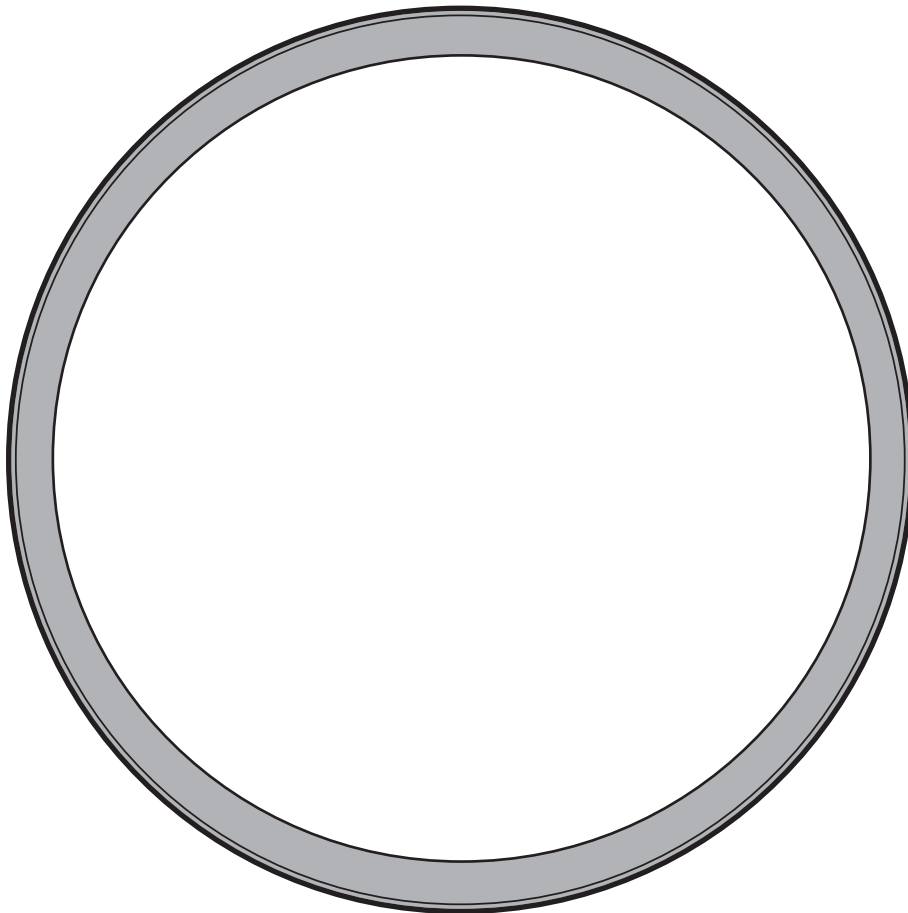
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EYEPIECE SIZE: _____

SEEING CONDITIONS: EXCELLENT GOOD POOR

NOTES: _____





DRAWING OF IMAGE

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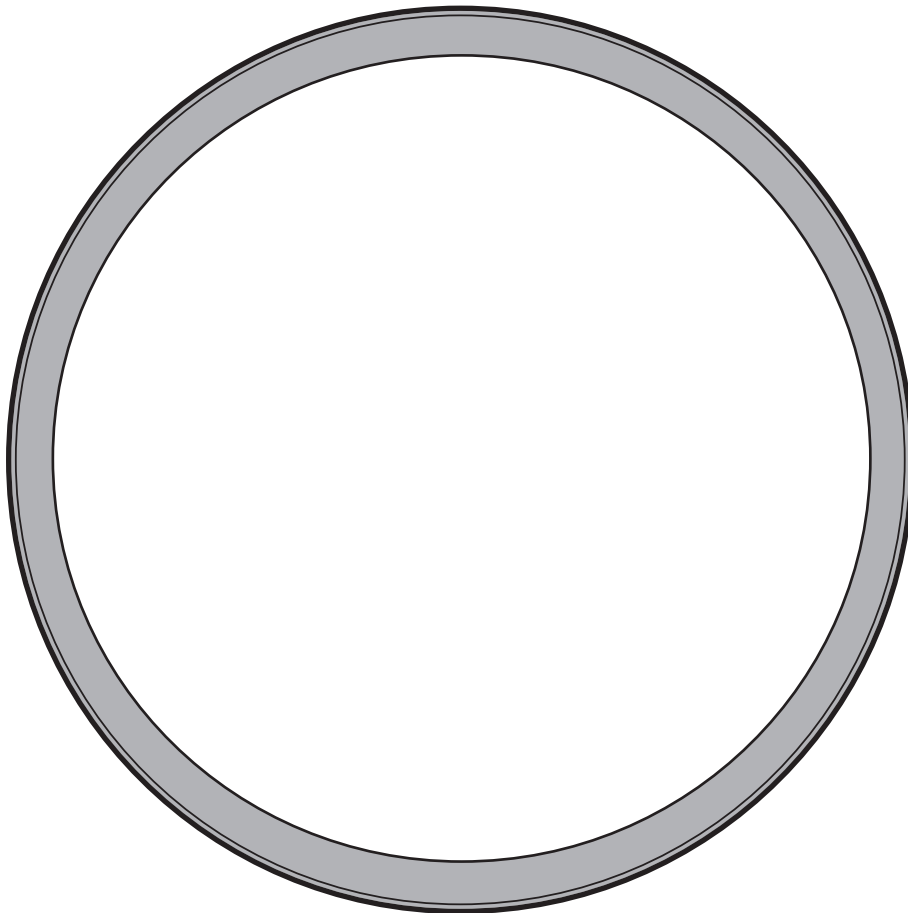
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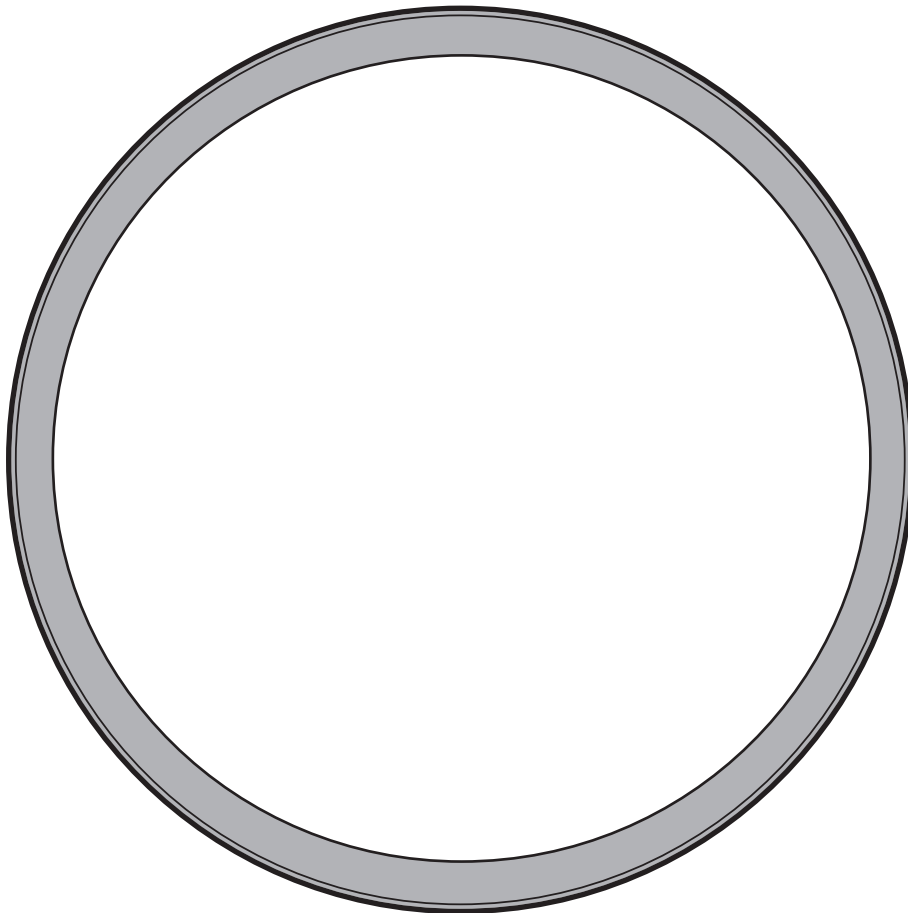
CONSTELLATION: _____

EYEPIECE SIZE: _____

SEEING CONDITIONS: EXCELLENT GOOD POOR

NOTES: _____





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(800) 626-3233 ■ www.meade.com

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