



TRAVEL SCOPE™ 70

IDEAL FOR BOTH TERRESTRIAL AND ASTRONOMICAL OBSERVING



INSTRUCTION MANUAL

Model #22028-CGL

CONTENTS

INTRODUCTION 3

SOLAR WARNING 3

WHAT'S IN THE BOX. 4

ASSEMBLING YOUR TELESCOPE. 4

Setting up the Tripod 5

Attaching the Telescope Tube to the Tripod 6

Moving the Travel Scope Manually 6

Installing the Diagonal & Eyepiece 7

Installing the Finderscope. 7

Aligning the Finderscope 8

TELESCOPE BASICS. 9

Focusing 9

Calculating Magnification 9

Determining Field of View 9

General Observing Hints 10

TELESCOPE MAINTENANCE 10

Care and Cleaning of the Optics 10

TECHNICAL SPECIFICATIONS 11

CELESTRON TWO YEAR LIMITED WARRANTY. 12

INTRODUCTION

Congratulations on your purchase of a Celestron Travel Scope. This telescope is constructed of high-quality materials to give you a lifetime of pleasure with a minimal amount of maintenance.

This telescope was designed with traveling in mind with a compact and portable design with ample optical performance. Your Travel Scope is ideal for terrestrial as well as casual astronomical observation.

The Travel Scope carries a **two-year limited warranty**. For details, see our website at www.celestron.com

Some of the Travel Scope's key features include:

- Coated glass optical elements for clear, crisp images.
- An erect image diagonal so that your views are correctly oriented.
- A smooth functioning altazimuth mount to help you point the telescope at objects.
- A preassembled, full-size aluminum tripod for a stable platform.
- Quick and easy no-tool set up.
- A backpack for easy storage and transport.

Please read through this manual before you embark on your journey through the Universe. It may take a few observing sessions to become familiar with your telescope, so you should keep this manual handy until you have fully mastered your telescope's operation. In it, you'll find detailed instructions, reference material, and helpful hints to make your observing experience as enjoyable as possible.

Before we begin, there are a few things to keep in mind to ensure your safety and protect your equipment.

SOLAR WARNING

- Never look directly at the Sun with the naked eye or with a telescope unless you have the proper solar filter. Permanent and irreversible eye damage may result.
- Never use your telescope to project an image of the Sun onto any surface. Internal heat build-up can damage the telescope and any accessories attached to it.
- Never use an eyepiece solar filter or a Herschel wedge. Internal heat build-up inside the telescope can cause these devices to crack or break, allowing unfiltered sunlight to pass through to the eye.
- Do not leave the telescope unsupervised, either when children or adults unfamiliar with the correct operating procedures of your telescope are present.

WHAT'S IN THE BOX

Save your telescope box so you can use it to store the telescope when it is not in use. Unpack the box carefully as some parts are small. Use the parts list below to verify that all parts and accessories are present.

PARTS LIST



Fig. 1 Travel Scope 70

1. Finderscope
2. Eyepiece
3. Erect Image Diagonal
4. Focus Knob
5. Pan Handle Control Knob
6. Objective Lens
7. Telescope Optical Tube
8. Tripod Head Platform
9. Azimuth Locking Knob
10. Central Column Locking Knob
11. Tripod

ASSEMBLING YOUR TELESCOPE

We recommend setting up your telescope indoors the first time you use it so you can familiarize yourself with its parts and the setup procedure.

In addition to the parts listed above, you'll find one additional eyepiece (both a 20mm eyepiece and a 10mm eyepiece are included), a Quick Setup Guide, a Starry Night Basic Edition download code card, a SkyPortal app download card, and an embroidered travel backpack inside the box.



SETTING UP THE TRIPOD

1. The tripod comes preassembled. Start by spreading the legs outward. At this point, the tripod will measure 16" tall. You can use the tripod in this position on a tabletop or extend the legs further for additional height.
2. To extend the tripod legs to your desired height, unlock the tripod leg clamps at the bottom of each leg (Fig. 4) and pull down. Close the leg clamp to secure each leg. When all three legs are fully extended, the tripod will look like Fig. 5 and measure about 42" in height.
3. For an additional boost in height, you can raise the central column at the top of the tripod. To do this, turn the central column locking knob (Fig. 6) counterclockwise until it is loose. Pull up on the head of the tripod until you reach your desired height. Then tighten the locking knob. The maximum height of the tripod is 49".



Fig. 3

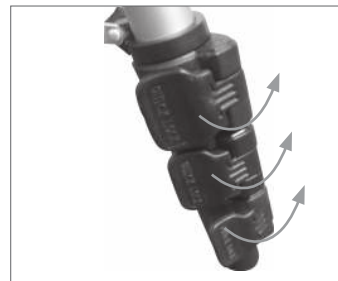


Fig. 4

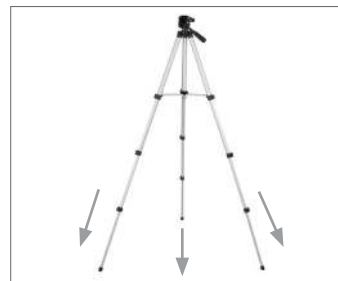


Fig. 5



Fig. 6

ATTACHING THE TELESCOPE TUBE TO THE TRIPOD

Before you attach the telescope tube, ensure that all of the knobs on the tripod are locked and secure.

1. Remove the protective paper covering the optical tube.
2. Loosen the tripod platform knob (Fig. 7) by turning it counterclockwise. Tilt the tripod platform up 90° as shown in Fig. 8. Tighten the knob to secure the platform in place.
3. Under the center of the tripod platform, you will see a knob (Fig. 9) that contains a 1/4"x20 screw. Insert the screw into one of the threaded holes on the telescope tube's mounting bracket. (It doesn't matter which hole you use.)
4. Hold the telescope tube with one hand and thread the screw into the mounting bracket with the other hand. Now the assembly will look like Fig. 10.
5. Loosen the tripod platform knob and lower the platform (with telescope attached) to the level position. Tighten the knob to secure.



Fig. 7



Fig. 8



Fig. 9



Fig. 10

MOVING THE TRAVEL SCOPE MANUALLY

The Travel Scope is easy to move in any direction. To tilt the telescope up or down, use the Pan Handle Control Knob (Fig. 1, #11). To pan the telescope side to side, use the Azimuth Locking Knob (top left knob in Fig. 7). Loosen the knobs by turning them counterclockwise and tighten them by turning them clockwise.

INSTALLING THE DIAGONAL AND EYEPIECE

The diagonal is a prism that diverts the light traveling through the telescope so you can observe at a more comfortable viewing angle. The Travel Scope diagonal is an erect image model that corrects the image to be right side up and oriented correctly left-to-right, which is much easier to use for terrestrial observing. You can rotate the diagonal to any position you prefer. To install the diagonal and eyepiece:

1. Remove the cap from the opening at the rear of the telescope tube and the caps from the barrels on the diagonal. Make sure that the two setscrews on the rear of the telescope tube are not protruding into the opening. Insert the small barrel of the diagonal all the way into the rear opening of the telescope tube. Tighten the two setscrews to secure the diagonal in place, taking care not to overtighten.
2. Make sure the setscrew at the other end of the diagonal is not protruding into the opening. Place the chrome barrel end of the eyepiece into the diagonal and tighten the setscrew, taking care not to overtighten.

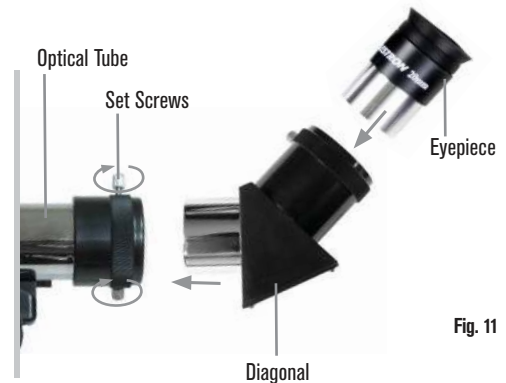


Fig. 11

INSTALLING THE FINDERSCOPE

1. Locate the finderscope bracket. The finderscope is already mounted inside.
2. Remove the knurled nuts on the threaded posts on the telescope tube (Fig. 12).
3. Orient the finderscope so that the larger diameter lens is facing toward the front of the telescope tube. Place the finderscope bracket over the posts. Holding the bracket in place, thread the knurled nuts onto the posts to secure the finderscope bracket in place.
4. Remove the lens caps from both ends of the finderscope.

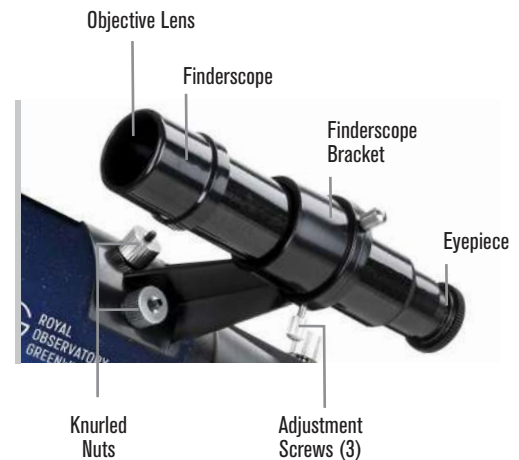


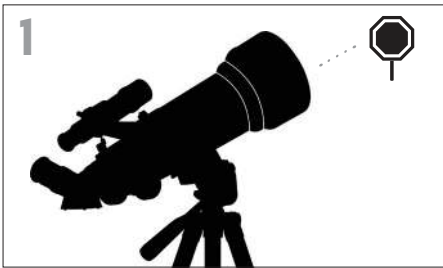
Fig. 12

ALIGNING THE FINDERSCOPE

The finder is one of the most important parts of your telescope. It helps you locate objects and center them in the eyepiece. The first time you assemble your telescope, you need to align the finder to the telescope's main optics. It's best to do this during the day*.

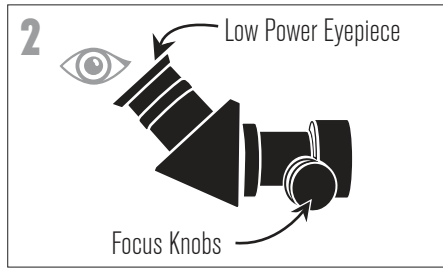


* **SOLAR WARNING!** Never attempt to view the Sun through any telescope without a proper solar filter!



1 CHOOSE A TARGET

Take the telescope outside during the day and find an easily recognizable object, like a streetlight, license plate or sign. The object should be as far away as possible, but at least a quarter mile away.



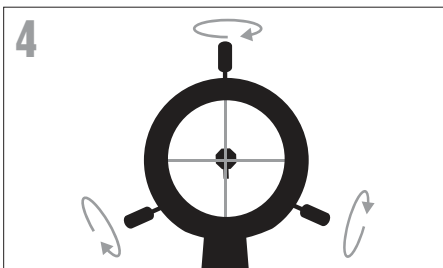
2 CENTER THE TARGET IN THE EYEPIECE

Look through the telescope using your lower powered eyepiece. Move the telescope until the object you chose lies in the center of the view. If the image is blurry, gently turn the focus knobs until it comes into sharp focus.



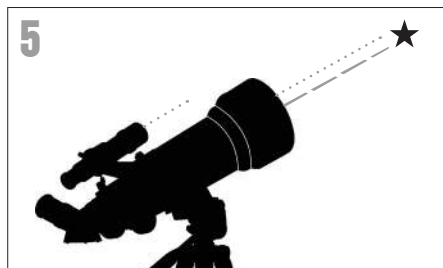
3 LOOK THROUGH FINDERSCOPE

Once the object is centered in your 20mm eyepiece, look through the finder scope and locate the crosshair reticle.



4 ADJUST THE FINDERSCOPE

Without moving the telescope, use the three adjustment screws on the finderscope bracket to move the finder around in the bracket until the crosshair appears over the same object you are observing in the telescope's 20mm eyepiece.



5 YOUR FINDERSCOPE IS NOW ALIGNED!

It should not require realignment unless it is bumped or dropped.

TIP: Try adjusting one screw at a time. Loosen one screw by half a turn and tighten another by the same amount to ensure the finderscope is securely held in place.

TELESCOPE BASICS

FOCUSING

To focus your Travel Scope, turn the focus knob located near the rear of the telescope (see Fig. 1). Turning the knob counterclockwise allows you to focus on an object that is farther than the one you are currently observing. Turning the knob clockwise from you allows you to focus on an object closer than the one you are currently observing.

Note: Remove the front lens cap of the Travel Scope optical tube prior to observing.

Note: If you wear eyeglasses, you may want to remove them when observing. However, if you have astigmatism, you should wear your corrective lenses at all times.

CALCULATING MAGNIFICATION

You can change the power of your telescope just by changing the eyepiece. To determine the magnification of your telescope, simply divide the focal length of the telescope by the focal length of the eyepiece you are using. In equation format, the formula looks like this:

$$\text{Magnification} = \frac{\text{Focal length of Telescope (mm)}}{\text{Focal length of Eyepiece (mm)}}$$

Let's say, for example, you are using the 20mm eyepiece that came with your Travel Scope 70. To determine the magnification, divide the focal length of your telescope (in this case, 400mm) by the focal length of the eyepiece, 20mm. Dividing 400 by 20 yields a magnification of 20x.

Although the power is variable, every telescope has a limit to its highest useful magnification. The general rule is that 60 power can be used for every inch of aperture. For example, the Travel Scope 70 is 2.8" in diameter. Multiplying 2.8 by 60 gives a maximum useful magnification of 168 power. Although this is the maximum useful magnification, most of your observing will be done at lower power, which provides much brighter and sharper images.

Note on Using High Magnification: Higher powers are used mainly for lunar and sometimes planetary observing. Remember, when magnification is high, contrast and brightness will be very low. For the brightest images with the highest contrast levels, use lower powers.

You can purchase additional eyepieces to give you a range of powers to choose from. Visit the Celestron website to see what is available.

DETERMINING FIELD OF VIEW

Determining the field of view is important if you want to get an idea of the angular size of the object you are observing. To calculate the actual field of view, divide the apparent field of the eyepiece (supplied by the eyepiece manufacturer) by the magnification. In equation format, the formula looks like this:

$$\text{True Angular Field} = \frac{\text{Apparent Field of Eyepiece}}{\text{Magnification}}$$

As you can see, before determining the field of view, you must calculate the magnification. Using the example in the previous section, the 20mm eyepiece included with your Travel Scope 70 has an apparent field of view of 50°. Divide the 50° by the magnification, which is 20 power. This yields an actual (true) field of 2.5°.

To convert degrees to feet at 1,000 yards (which is more useful for terrestrial observing) multiply by 52.5. Multiply the angular field of 2.5° by 52.5. This produces a linear field width of 131 feet at a distance of one thousand yards.

GENERAL OBSERVING HINTS

When using any optical instrument, there are a few things to remember to ensure you get the best possible image.

- Never look through window glass. Glass found in household windows is optically imperfect, and as a result, may vary in thickness from one part of a window to the next. This inconsistency can and will affect the ability to focus your telescope. In most cases, you will not be able to achieve a truly sharp image. In some cases you may actually see a double image.
- Never look across or over objects that are producing heat waves. This includes asphalt parking lots on hot summer days or building rooftops.
- Hazy skies, fog, and mist can also make it difficult to focus when viewing terrestrially. You'll see much less detail in objects when observing in these conditions.

NOTE: Your telescope was designed for terrestrial observation as well as celestial viewing.

TELESCOPE MAINTENANCE

While your telescope requires little maintenance, there are a few things to remember to ensure your telescope performs at its best.

CARE AND CLEANING OF THE OPTICS

Occasionally, dust and/or moisture may build up on the telescope's objective lens. Take extra care when cleaning your telescope's optical components to avoid damaging them.

If dust has built up on the optics, remove it with a brush (made of camel's hair) or a can of pressurized air. Spray at an angle to the glass surface for approximately two to four seconds. Then, use an optical cleaning solution and white tissue paper to remove any remaining debris. Apply the solution to the tissue and then apply the tissue paper to the optics. Low pressure strokes should go from the center of the lens (or mirror) to the outer portion. **Do NOT rub in circles!**

You can use a commercially made lens cleaner or mix your own. A good cleaning solution is isopropyl alcohol mixed with distilled water. The solution should be 60% isopropyl alcohol and 40% distilled water. You can also use a few drops of liquid dish soap diluted into one quart of water.

Occasionally, you may experience dew build-up on the optics of your telescope during an observing session. If you want to continue observing, the dew must be removed, either with a hair dryer (on low setting) or by pointing the telescope at the ground until the dew has evaporated.

If moisture condenses on the inside of the optics, remove the accessories from the telescope. Place the telescope in a dust-free environment and point it down. This will remove the moisture from the telescope tube.

To minimize the need to clean your telescope, replace all lens covers once you have finished using it. Since the cells are NOT sealed, adding the lens covers will help prevent contaminants from entering the tube.

Internal adjustments and cleaning should be done only by the Celestron repair department. If your telescope is in need of internal cleaning, please call the factory for a return authorization number and price quote.

TECHNICAL SPECIFICATIONS	Model # 22028 Travel Scope 70
Optical Design	Refractor
Aperture	70mm (2.8")
Focal Length	400mm
Focal Ratio	f/5.7
Optical Coatings	Fully Coated
Finderscope	5x24
Diagonal	Erect Image - 45° 1.25"
Eyepieces	20mm 1.25" (20x)
	10mm 1.25" (40x)
Apparent Field of View	20mm @ 50°
	10mm @ 50°
Angular Field of View	20mm @ 2.5°
	10mm @ 1.3°
Linear Field of View –	
ft/1000 yards	20mm @ 131/44
m/1000 meters	10mm @ 67/22
Near Focus w/20 mm Eyepiece	19' (5.8 m)
Mount	Altazimuth (Photo Tripod)
Altitude Locking Knob	Yes
Azimuth Locking Knob	No
Astronomy Software Download	Yes
Highest Useful Magnification	168x
Limiting Stellar Magnitude	11.7
Resolution -- Raleigh (arc seconds)	1.98
Resolution -- Dawes Limit " "	1.66
Light Gathering Power	100x
Optical Tube Length	431.8mm (17")
Telescope Weight	1.5lb (.68 kg)

Note: Specifications are subject to change without notice or obligation.



TWO-YEAR LIMITED WARRANTY

Our telescope has a TWO-YEAR LIMITED WARRANTY. For detailed information and to register your new product, please visit [celestron.com/pages/warranty](https://www.celestron.com/pages/warranty)

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



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Torrance, CA 90503 USA

This product is designed and intended for use by those 14 years of age and older. (Most of our products are 14+, unless they are toys).



SOLAR WARNING: Never attempt to view the sun through any telescope without a proper solar filter.

NEED ASSISTANCE?

Contact Celestron Technical Support
[celestron.com/pages/technical-support](https://www.celestron.com/pages/technical-support)

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