saxon

1026AZ3 SC

Refractor Telescope
Instruction Manual
SKU# 214224

Saxon 1026AZ3 SC
Refractor Telescope Features

CAUTION!

- Never use your telescope to look directly at the sun. Permanent eye damage will result. Use a proper solar filter for viewing the sun. When observing the sun, place a dust cap over your finderscope to protect it from exposure. Never use an eyepiece-type solar filter and never use your telescope to project sunlight onto another surface, the internal heat build-up will damage the telescope optical elements.

Operating your telescope #1

Setting up your telescope

Remove the tripod, telescope and accessories from the box.

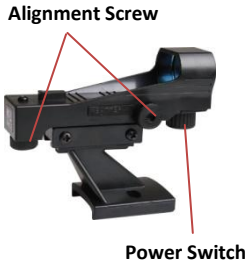
1. Set the tripod upright and pull the tripod legs outward until each leg is fully extended.
2. Attach the accessory tray to the tripod.
3. You can adjust tripod height by releasing tripod leg lock thumbscrew and lock the thumbscrew at your desired height.
4. Attach the slow motion controls to the mount.
5. Attach the telescope to the mount using the optical tube attachment knob.
6. Attach the erect prism diagonal to the focuser drawtube.
7. Attach the eyepiece to the erect prism diagonal.
8. Attach the finderscope to the telescope.

Adjusting your telescope

1. You may adjust the telescope upwards or downwards with the pan handle at the rear of the mount to make coarse adjustment.
2. You may adjust the telescope left or right by the azimuth adjustment. Loose the azimuth adjustment anti-clockwise, lock the azimuth adjustment at the desired position by turning clockwise.
3. You may also use the slow-motion controls to fine adjust your telescope.

Finderscope alignment

When a finderscope is correctly aligned with the telescope, objects can be quickly located and brought to the centre of the field. Alignment is best done outdoors in day light when it is easier to locate objects. If it is necessary to refocus your finderscope, sight on an object that is at least 500 meters away.

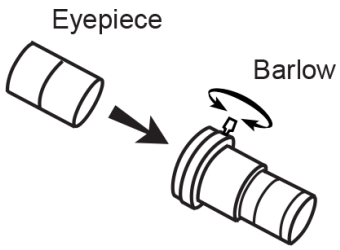


1. Choose a distant object that is at least 500 meters away and point the main telescope at the object. Adjust the telescope so that the object is in the centre of the view in your eyepiece.
2. Check the finderscope to see if the centered object in the main telescope view is centered on the finderscope.
3. Use the two alignment screws to overlap the red-dot to the object.

Operating your telescope #2

Using the Barlow Lens

A Barlow is negative lens which increases the magnifying power of an eyepiece, while reducing the field of view. It expands the cone of the focused light before it reaches the focal point, so that the telescope's focal length appears longer to the eyepiece.

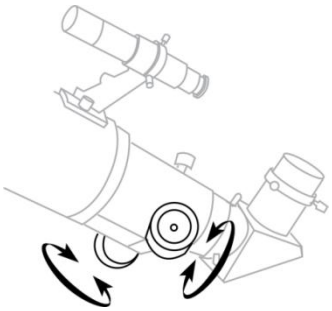


The Barlow is usually inserted between the diagonal and the eyepiece. With some telescopes, it can also be inserted between the focuser and the diagonal, and with this position it gives even greater magnification. For example, a Barlow which is 2x when inserted after the diagonal can become 3x when placed in front of the diagonal.

In addition to increasing magnification, the benefits of using a Barlow lens include improved eye relief, and reduced spherical aberration in the eyepiece. For this reason, a barlow plus a lens often outperform a single lens producing the same magnification. However, its greatest value may be that a barlow can potentially double the number of eyepiece in your collection.

Focusing your telescope

Slowly turn the focus knobs under the focuser, one way or the other, until the image in the eyepiece is sharp. The image usually has to be finely refocused over time, due to small variations caused by temperature changes, flexures, etc. This often happens with short focal ratio telescopes, particularly when they haven't yet reached outside temperature. Refocusing is almost always necessary when you change an eyepiece or add or remove a Barlow lens.



Understand your telescope more

Calculating the magnification (power)

The magnification produced by a telescope is determined by the focal length of the eyepiece that is used with it. To determine a magnification for your telescope, divide its focal length by the focal length of the eyepieces you are going to use. For example, a 10mm focal length eyepiece will give 66X magnification with a 660mm focal length telescope.

$$\text{Magnification} = \frac{\text{Focal length of the telescope}}{\text{Focal length of the eyepiece}} = \frac{660\text{mm}}{10\text{mm}} = 66\text{x}$$

When you are looking at astronomical objects, you are looking through a column of air that reaches to the edge of space and that column seldom stays still. Similarly, when viewing over land you are often looking through heat waves radiating from the ground, house, buildings, etc. Your telescope may be able to give very high magnification but what you end up magnifying is all the turbulence between the telescope and the subject. A good rule of thumb is that the usable magnification of a telescope is about 2X per mm of aperture under good conditions.

Calculating the field of view

The size of the view that you see through your telescope is called the true (or actual) field of view and it is determined by the design of the eyepiece. Every eyepiece has a value, called the apparent field of view, which is supplied by the manufacturer. Field of view is usually measured in degrees and/or arc-minutes (there are 60 arc-minutes in a degree). The true field of view produced by your telescope is calculated by dividing the eyepiece's apparent field of view by the magnification that you previously calculated for the combination. Using the figures in the previous magnification example, if your 10mm eyepiece has an apparent field of view of 52 degrees, then the true field of view is 0.79 degrees or 47 arc-minutes.

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

To put this in perspective, the moon is about 0.5° or 30 arc-minutes in diameter, so this combination would be fine for viewing the whole moon with a little room to spare. Remember, too much magnification and too small a field of view can make it very hard to find things. It is usually best to start at a lower magnification with its wider field and then increase the magnification when you have found what you are looking for. First find the moon then look at the shadows in the craters!

Calculating the exit pupil

The Exit Pupil is the diameter (in mm) of the narrowest point of the cone of light leaving your telescope. Knowing this value for a telescope-eyepiece combination tells you whether your eye is receiving all of the light that your primary lens or mirror is providing. The average person has a fully dilated pupil diameter of about 7mm. This value varies a bit from person to person, is less until your eyes become fully dark adapted and decreases as you get older. To determine an exit pupil, you divide the diameter of the primary of your telescope (in mm) by the magnification.

$$\text{Exit Pupil} = \frac{\text{Diameter of Primary mirror in mm}}{\text{Magnification}}$$

For example, a 200mm f/5 telescope with a 40mm eyepiece produces a magnification of 25x and an exit pupil of 8mm. This combination can probably be used by a young person but would not be of much value to a senior citizen. The same telescope used with a 32mm eyepiece gives a magnification of about 31x and an exit pupil of 6.4mm which should be fine for most dark adapted eyes. In contrast, a 200mm f/10 telescope with the 40mm eyepiece gives a magnification of 50x and an exit pupil of 4mm, which is fine for everyone.

Observing the Sky

1. Sky conditions

Sky conditions are usually defined by two atmospheric characteristics, seeing, or the steadiness of the air, and transparency, light scattering due to the amount of water vapour and particulate material in the air. When you observe the Moon and the planets, and they appear as though water is running over them, you probably have bad "seeing" because you are observing through turbulent air. In conditions of good "seeing", the stars appear steady, without twinkling, when you look at them with unassisted eyes (without a telescope). Ideal "transparency" is when the sky is inky black and the air is unpolluted.

2. Selecting an observing site

Travel to the best site that is reasonably accessible. It should be away from city lights, and upwind from any source of air pollution. Always choose as high an elevation as possible; this will get you above some of the lights and pollution and will ensure that you aren't in any ground fog. Sometimes low fog banks help to block light pollution if you get above them. Try to have a dark, unobstructed view of the horizon, especially the southern horizon if you are in the Northern Hemisphere and vice versa. However, remember that the darkest sky is usually at the "Zenith", directly above your head. It is the shortest path through the atmosphere. Do not try to observe any object when the light path passes near any protrusion on the ground. Even extremely light winds can cause major air turbulence as they flow over the top of a building or wall. If you try to observe on any structure, or even a sidewalk, movements you make may cause the telescope to vibrate. Pavement and concrete can also radiate stored heat which will affect observing.

Observing through a window is not recommended because the window glass will distort images considerably. And an open window can be even worse, because warmer indoor air will escape out the window, causing turbulence which also affects images. Astronomy is an outdoor activity.

3. Choosing the best time to observe

The best conditions will have still air, and obviously, a clear view of the sky. It is not necessary that the sky be cloud-free. Often broken cloud conditions provide excellent seeing. Do not view immediately after sunset. After the sun goes down, the Earth is still cooling, causing air turbulence. As the night goes on, not only will seeing improve, but air pollution and ground lights will often diminish. Some of the best observing time is often in the early morning hours. Objects are best observed as they cross the meridian, which is an imaginary line that runs through the Zenith, due North-South. This is the point at which objects reach their highest points in the sky. Observing at this time reduces bad atmospheric effects. When observing near the horizon, you look through lots of atmosphere, complete with turbulence, dust particles and increased light pollution.

4. Cooling the telescope

Telescopes require at least 10 to 30 minutes cooling down to outside air temperature. However this may take longer if there is a big difference between the temperature of the telescope and the outside air. This minimizes heat wave distortion inside telescope tube (tube currents). Allow a longer cooling time for larger optics. If you are using an equatorial mount, use this time for polar alignment.

5. Using your eyes

Do not expose your eye to anything except red light for 30 minutes prior to observing. This allows your pupils to expand to their maximum diameter and biochemical light adaptation to occur. It is important to observe with both eyes open. This avoids fatigue at the eyepiece, allows you to check against reference material, and is a good habit to develop if you sketch at the eyepiece. If you find this too distracting, cover the unused eye with your hand or an eye patch. Use averted vision on faint objects: The center of your eye is the least sensitive to low light levels. When viewing a faint object, don't look directly at it. Instead, look slightly to the side, and the object will appear brighter.

Australian Astronomical Society

Victoria
Mornington Peninsula Astronomical Society
Astronomical Society of Victoria
Astronomical Society of Melbourne
Ballarat Astronomical Society
Bendigo District Astronomical Society
Latrobe Valley Astronomical Society
The Astronomical Society of East Gippsland
Oasis Stargazers Club Mildura Inc
Snake Valley Astronomical Society
Astronomical Society of Geelong

South Australia
Astronomical Society of South Australia

Tasmania
Astronomical Society of Tasmania Inc.

Queensland
Southern Astronomical Society (QLD) Inc
Astronomical Association of Queensland
Brisbane Astronomical Society
South East Queensland Astronomical Society
Townsville Astronomy Group
Mt. Isa Astronomy Group
Bundaberg Astronomical Society

Western Australia
Astronomical Society of WA

New South Wales & ACT
Astronomical Society of NSW
Sydney Northwest Astronomy Group
Western Sydney Amateur Astronomical
Northern Sydney Astronomical Society
Sutherland Astronomical Society
Redlands Astronomical Society
Astronomical Society of Coonabarabran
Macarthur Astronomical Society
Shoalhaven Astronomers
Wollongong Amateur Astronomy Club
Port Macquarie Astronomical Association
Central West Astronomical Society Inc
Canberra Astronomical Society
Astronomical Society of Albury Wodonga
Centaurus Astronomical Society
Grafton Astronomical Society
Coffs Harbour Astronomical Society Inc
Illawarra Astronomical Society
Hawkesbury Astronomical Association

Northern Territory
Darwin Astronomy Group
Gove Amateur Astronomers
Alice Springs Astronomical Society

Specification

Specifications	
Optical Design	Achromatic Refractor
Aperture (mm)	102mm (4 inch)
Focal Length	660mm
Focal Ratio	F/6.5
Eyepiece #1	26mm (25x magnification)
Eyepiece #2	9mm (73x magnification)
Eyepiece #3	6.3mm (105x magnification)
Finderscope	Red-dot finderscope
Maximum Practical Magnification	204x
Warranty	5-Years limited warranty

What's included in the box

1x Saxon D102mm x F660mm SC Refractor Telescope
1x Red-dot finderscope
1x 26mm Eyepiece
1x 9mm Eyepiece
1x 6.3mm Eyepiece
1x 90 Degree Erect Prism Diagonal
1x 2x Barlow Lens (attach before an eyepiece to achieve double magnification!)
1x Stainless Steel Tripod with Accessory Tray
2x Slow Motion Controls
1x User Manual
1x Star & Moon Chart

You can also obtain the e-Manual from our website at

www.saxon.com.au

We recommend the following accessories for your telescope

Saxon 1.25” Colour Planetary Filter Set

SKU# 643905

The **saxon 1.25" Colour Planetary Filter Set** is a great addition for lunar and planetary observing. They help increase image contrast and resolution on the Moon and planets as well as reduce glare from the full or near-full Moon.

The set comes in four colours of Yellow (#12), Red (#23A), Neutral Density (#25) and Blue (#80A).

Saxon Super Wide Angle Eyepieces (68 degree)

The saxon Super Wide Angle (SWA) eyepieces can be used on all types of telescopes – refractor, reflector and catadioptrics. These eyepieces featuring an 8-elements design and offer excellent light transmission, colour correction and long eye relief.

The 68° apparent field of view gives wide views, allowing you to see the entire object clearly. The eyepiece's blackened lens edges provides for improved contrast and the rubber grips maximise comfort and safety. The eyepiece also comes with a rubber eye guard which helps eliminate stray light.

Available in:

3.5mm	**5mm**	**8mm**	**13mm**	**17mm**	**21mm**
189x	**132x**	**83x**	**51x**	**39x**	**31x**
SKU#512035	**SKU#512005**	**SKU#512008**	**SKU#512013**	**SKU#512017**	**SKU#512021**

Saxon 1.25” Plossl Eyepieces

The saxon Plossl eyepieces are a class on its own. With edge-to-edge blackened optics, this Plossl eyepiece features a 4-element design that delivers clear, high contrast images while minimising spherical aberration and distortion.

Featuring a 4-element design, this Plossl eyepiece ensures maximum light transition, minimises spherical aberration, distortion, astigmatism and off-axis colour. The edge-to-edge blackened optics provides excellent contrast across the 50° apparent field of view.

Available in:

6.3mm	**10mm**	**12.5mm**	**15mm**	**20mm**	**25mm**	**30mm**	**40mm**
105x	**66x**	**53x**	**44x**	**33x**	**26x**	**22x**	**17x**
#510163	**#510110**	**#510012**	**#510015**	**#510020**	**#510125**	**#510030**	**#510040**

Saxon Weather Station WSD006

SKU# 710100

The saxon Weather Station WSD006 is a classy weather station that's easy to use and setup.

With thermo-hygrometer sensors for indoor and outdoor temperatures, the WSD006 is feature-packed:

- Hour, minute and second 12 or 24 hour display
- Time, day, date, month display
- Alarm with snooze
- Temperature in selectable Cº or Fº
- Indoor humidity display

The saxon Weather Station WSD006 is powered by 2 x AAA batteries.

Taking photo? We got you covered!

Saxon 1.25” Variable-Projection Camera Adapter

The saxon 1.25” Variable-Projection Camera Adapter allows you to take photography with your DSLR camera (a t-mount must be applied to your brand of DSLR camera).

This adapter can be used for either prime focus (without eyepiece) or with an eyepiece. Prime focus can also be achieved with the threaded-in separable unit.

SKU# 644001

Saxon T-mount for various camera brands

The T-mount is a standard lens mount for cameras. Different camera brands have different thread on its camera body.

Kindly contact us if you are unsure of which T-mount to be purchased.

Available in:

Canon	Nikon	Minolta/Sony	Pentax
#640001	#640002	#640003	#640004

Saxon 1.25” Universal Digital Camera Bracket Adapter

The saxon 1.25” Variable-Projection Camera Adapter is an exceptional convenient instrument to couple almost any brands of compact digital cameras.

This adapter can be attach to spotting scope, telescopes and monocular for photographic use in no need of additional setup attachments.

SKU# 644010

Saxon 1.25” Colour Filters

The saxon 1.25” colour filters allow you to see and photograph fine details of the object by applying the right colour filters.

Available in:

No.8 Light Yellow	No.12 Yellow	No.21 Orange	No.23A Light Red	No.25A Red	No.56 Light Green	No.58 Green	No.80A Blue	No.82A Light Blue	ND96 Grey
#643208	#643212	#643221	#643223	#643225	#643256	#643258	#643280	#643282	#643003

My Astronomy Journey note

Date	Time	Location	Object	Remarks

saxon

Splendour Trading Australia Company

Show us your gear & nature photos on

#saxonoptics

#saxontelescope #saxonbinoculars

#saxonmicroscope #fingerscrossedclearsky

Email: sales@saxon.com.au

Visit us at: www.saxon.com.au