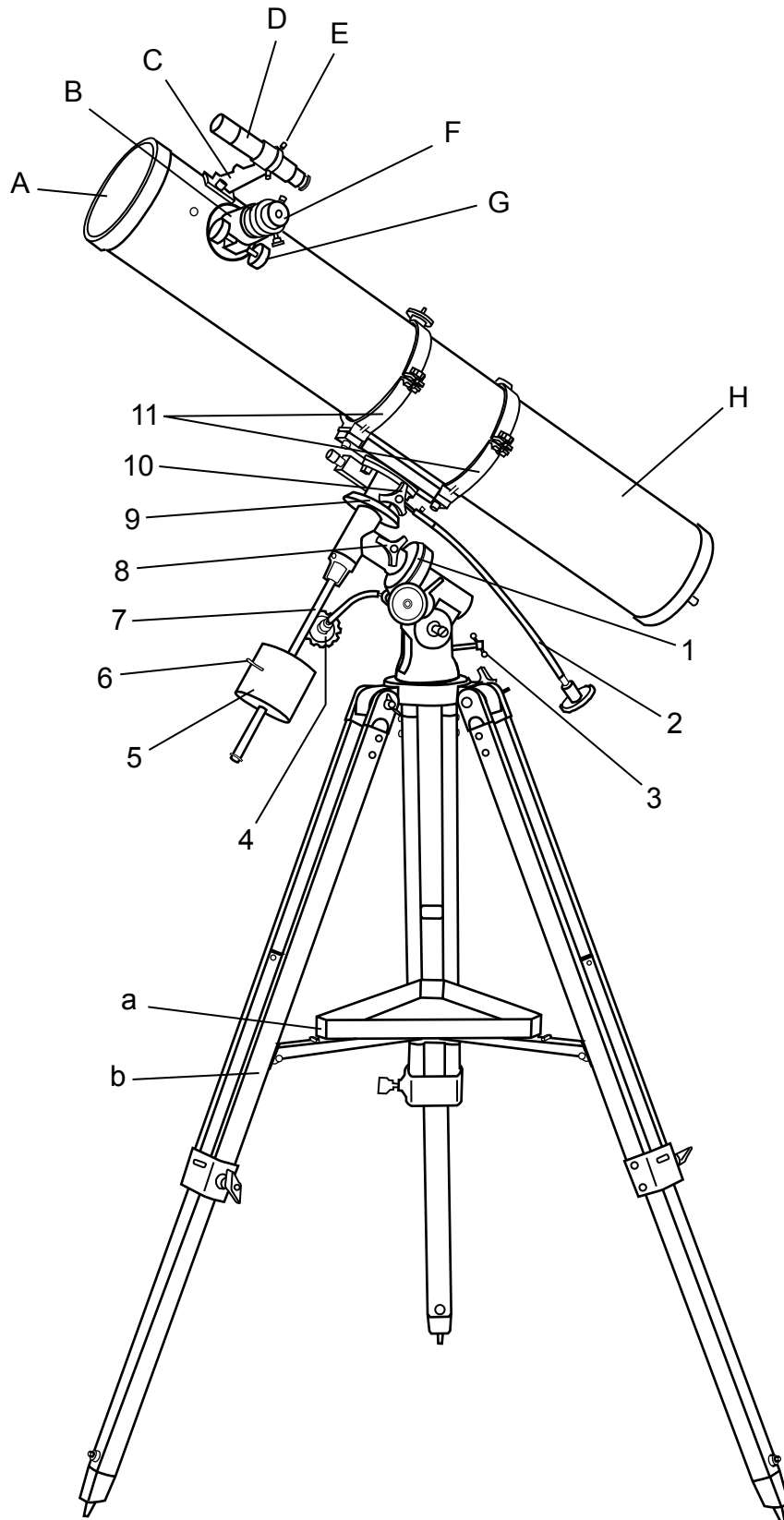


INSTRUCTION MANUAL

FOR 1149EQ2

Optical Tube: 114mm/900mm

Equatorial Mount: EQ2



A. Dust Cap (not shown)
Remove before Viewing
B. Focus Tube
C. Finderscope Bracket
D. Finderscope
E. Finderscope Adjustment
Screws
F. Eyepiece
G. Focus Knob
H. Telescope Main Body

1. Hour Axis Scale
2. Dec. Flexible Control Cable
3. Altitude Adjustable T-bolt
4. R.A. Flexible Control Cable
5. Counterweight
6. Counterweight Thumb
Screw
7. Counterweight Rod
8. R.A. Lock Knob
9. Dec. Scale
10. Dec. Lock Knob
11. Tube Rings
a. Accessory Tray
b. Tripod Leg

TABLE OF CONTENTS

— Assembling Your Telescope	3
Tripod Set up	3
Telescope Assembly	3
Finderscope Assembly	4
Eyepiece Assembly	4
— Operating Your Telescope	5
Aligning the Finderscope	5
Balancing Telescope	5
Using the Equatorial Mount (EQ2)	6
Using the Oculars	6
Proper Care for Your Telescope	6
— Suggested Reading	7

Before you begin

Follow the instructions for your specific model in the manual. Read the entire instructions carefully before beginning. Your telescope should be assembled during daylight hours. Choose a large, open area to work to allow room for all parts to be unpackaged.

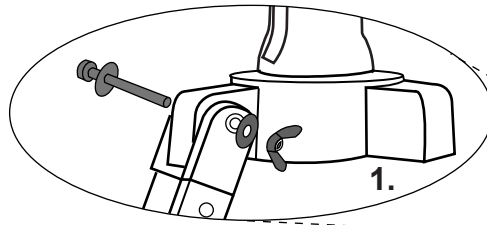
Caution!

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.

Technical Specifications

<i>Optical Design</i>	Newtonian
<i>Diameter</i>	114mm
<i>Focal Length</i>	900mm
<i>f/ratio</i>	f/8
<i>Highest Practical Power</i>	228x
<i>Fainest Steller Magnitude</i>	12.9
<i>Resolving Power (arc sec.)</i>	1
<i>Finderscope</i>	5x24
<i>Focuser Diameters</i>	1.25"
<i>Mount Type</i>	Equatorial
<i>Slow Motion Control</i>	RA & DEC
<i>Accessory Tray</i>	Large
<i>Tripod</i>	Aluminum
<i>Tube Dimensions</i>	15cm x 89cm
<i>Tripod Height</i>	71-123cm
<i>Total Net Weight</i>	16.7kgs
<i>Shipping Weight</i>	22.7kgs

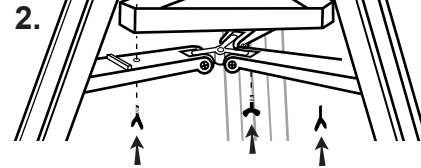
TRIPOD SET UP



ATTACHING MOUNT TO TRIPOD (1)

- 1) Locate Tripod legs and AZ mount/tripod head.
- 2) Fasten tripod legs to the bottom of the mount using bolts and wingnuts already attached to the top of each tripod leg. Align the tripod legs so that the hinge for the accessory tray faces inwards.

Note: To level the tripod, slacken the locking thumb screws on the side of the tripod leg and adjust the length of the legs.

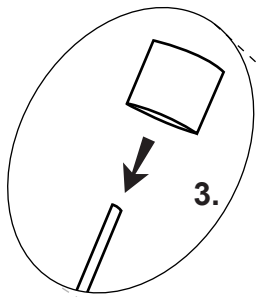


ATTACHING THE ACCESSORY TRAY (2)

- 1) Locate tripod leg brace.
- 2) Use the screws already attached to the hinges to mount the tray platform.
- 3) Secure the accessory tray on top of the tray platform using the thumbscrews already attached.

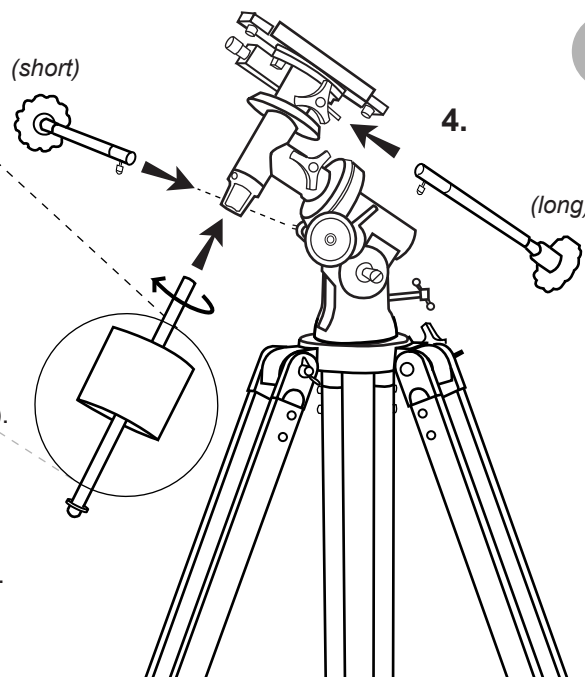
INSTALLING COUNTERWEIGHT (3)

- 1) Loosen latitude adjustment knob on side of equatorial mount and rotate top-half of mount into an upright position. The large scale (setting circle) should be vertical and the mounting bracket for the telescope tube should be at the top.
- 2) Slide counterweight halfway onto rod. Hold the counterweight with one hand and insert counterweight rod into threaded hole on mount with the other hand. Tighten counterweight rod onto mount.
- 3) Tighten thumbscrew to lock counterweight in place.



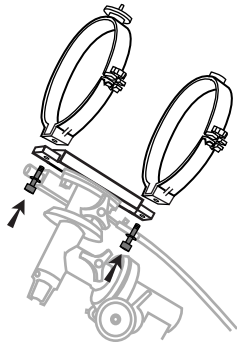
INSTALLING CONTROL CABLES (4)

- 1) Locate the control cables. The control cables have two different lengths. Although you can mount either cable to each direction axis, it is recommended that you mount the longer cable to the declination axis and the shorter cable to the right ascension axis (setting circle).
- 2) To install the control cables, slide the sleeve end of the cable over the nipple on the end of the worm gear. Tighten the cable using the set screw against the flat surface on the nipple.



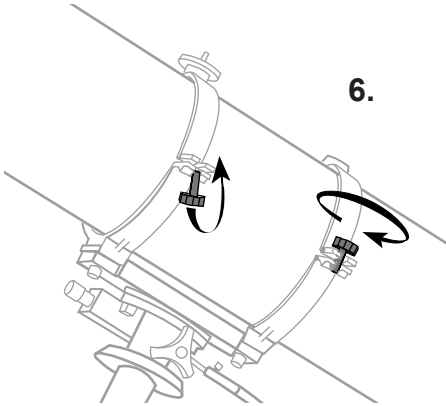
TELESCOPE ASSEMBLY

TELESCOPE ASSEMBLY



5. ATTACHING THE TUBE RINGS TO MOUNT(5)

- 1) Remove the telescope tube from its plastic packaging.
- 2) Remove the tube rings from telescope by releasing their thumb nuts and opening their hinges.
- 3) Using the bolts provided, fasten the tube rings to the mount with the 10mm wrench provided.

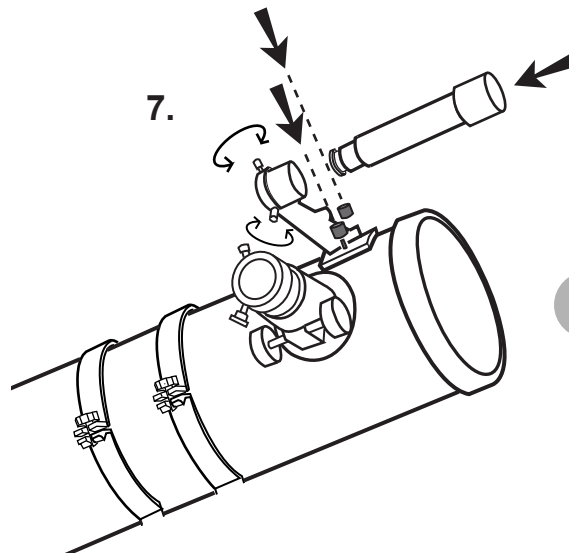


6. ATTACHING THE TELESCOPE MAIN TUBE TO TUBE RINGS (6)

- 1) Remove the telescope tube from the paper covering.
- 2) Find the center of balance of the telescope tube. Place this in between the two tube rings. Close the hinges around the telescope and fasten securely by tightening the thumb nuts. □

ATTACHING THE FINDERSCOPE (7)

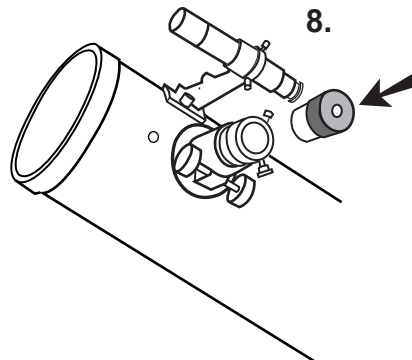
- 1) Locate finderscope optical assembly.
- 2) Remove the two knurled thumbscrews near the front of the telescope main body.
- 3) Position the finderscope bracket over the screws in the telescope main body.
- 4) Secure the finderscope bracket with the two knurled thumbscrews.
- 5) Slide finderscope in the bracket backwards and tighten the three alignment screws.



FINDERSCOPE ASSEMBLY

INSERTING EYEPIECE (8)

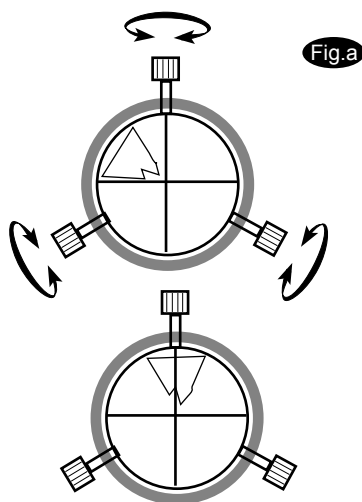
- 1) Unscrew the thumbscrews on the end of the focus tube to remove the black plastic end-cap.
- 2) Re-tighten thumb screws to hold eyepieces in place.



EYEPIECE ASSEMBLY

OPERATING YOUR TELESCOPE

Aligning the Finderscope



- 1) Focus the telescope eyepiece on a distant object.
- 2) Once the object has been centered in the telescope view, ensure the locking screws are tightened.
- 3) Use the three alignment screws to center the finderscope crosshairs on the object seen in the telescope view (Fig.a).

Depending on telescope design, the object may appear inverted in the telescope view.

Do not over-tighten the three alignment screws on the finderscope mount.

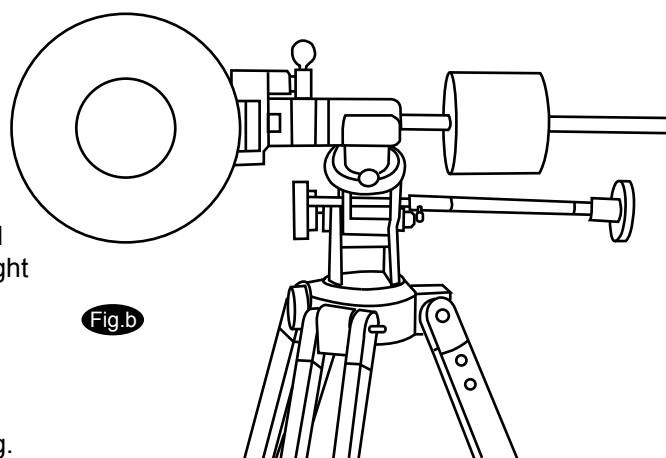
Balancing telescope

Telescope should be balanced before each observing session. Balancing reduces stress on telescope mount and allows precise control of micro-adjustment. A balanced telescope is specially critical when using the optional clock drive for astrophotography.

The telescope should be balanced after all accessories (eyepiece, camera, etc.) have been attached. Before balancing your telescope, make sure that your tripod is balanced and on a stable surface. For photography, point the telescope in the direction you will be taking photos before performing the balancing steps.

R.A. Balancing

- 1) Adjust altitude of the mount to between 15° and 30° by using the altitude adjustment T-bolt.
- 2) Slowly unlock the R.A. and Dec. lock knobs. Rotate the telescope unit both the optical tube and counterweight rod is horizontal to the ground, and the telescope tube is to the side of the mount. (Fig. b)
- 3) Tighten the Dec. lock knob.
- 4) Move counterweight along counterweight rod until telescope is balanced and remains stationary when released
- 5) Tighten counterweight thumb screws to hold the counterweight in its new position.



Dec. Balancing

All accessories should be attached to the telescope before commencing with balancing the declination axis. The R.A. axis should be balanced before proceeding with Dec. balancing.

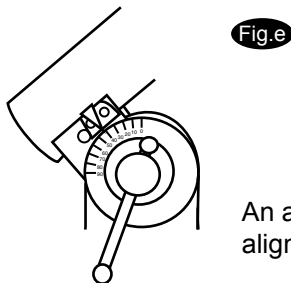
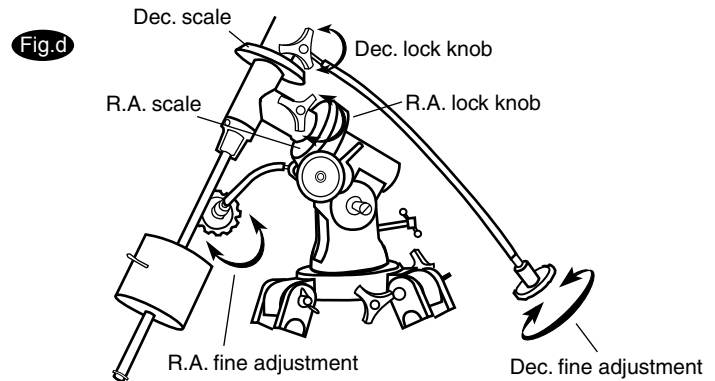
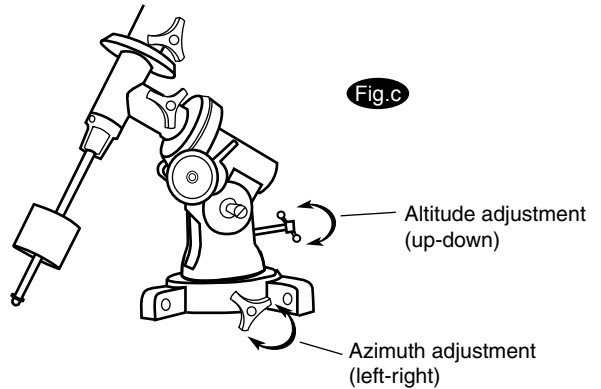
- 1) Adjust altitude of the mount to between 60° and 75° .
- 2) Release the R.A. lock knob and rotate R.A. axis so that the counterweight rod is in horizontal position. Tighten the R.A. thumbscrew.
- 3) Unlock the Dec. thumbscrew and rotate telescope tube until it is parallel to the ground.
- 4) Slowly release telescope and determine which direction the telescope rotates. Loosen telescope tube rings and slide telescope tube forward or backward in the clamps to balance Dec. axis.
- 5) Once telescope no longer rotates from its parallel starting position, re-tighten tube rings and the Dec. lock knob. Reset altitude axis to your local latitude.

OPERATING YOUR TELESCOPE

Using the EQ2 mount

The equatorial mount has controls for both conventional altitude (up-down) and azimuthal (left-right) directions of motion. These two directions are recommended for large direction changes and for terrestrial viewing. Use the large knurled knob near the base of the mount for azimuthal adjustments, and the altitude adjustment T-bolts for altitude adjustments. (Fig. c)

In addition, this mount has right ascension (hour angle) and declination direction controls for polar-aligned astronomical observing. Loosen the lock knobs to make large direction changes. Use the control cable for fine adjustment after the lock knobs have all been locked. (Fig. d)



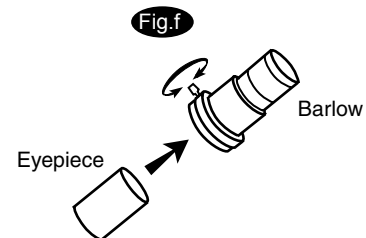
An additional scale is included for the altitude axis. This allows polar alignment for your local latitude. (Fig. e)

Using the oculars

To magnify images in the telescope, you need to insert an eyepiece (ocular) into the end of the focuser assembly. Insert the desired eyepiece and lightly tighten the thumbscrews to hold the eyepiece in place. Barlow lens can be used to increase magnification of the eyepiece. Install the barlow lens directly into the end of the focuser, then insert the eyepiece into the barlow lens. (Fig. f)

To locate an object in the eyepiece, first locate the object in the finderscope view. The finderscope allows magnification of a larger area than the higher power telescope view. Finderscope should be aligned during daytime before use.

The focus knobs at the base of the focuser uses a rack-and-pinion system to focus the magnified images seen through the telescope. Turn the knobs slowly until the objects are in focus.



Proper care for your telescope

Replace the dust cap over end of telescope whenever not in use. This prevents dust from settling on mirror or lens surface. Do not clean mirror or lens unless you are familiar with optical surfaces. Clean finderscope and eyepieces with special lens paper only. Cleaning and aligning of optical elements should be performed by an experienced technician every two years. Eyepieces should be handled with care, avoid touching optical surfaces.

Telescopes require about 30 minutes to equalize with surrounding temperature and humidity. This minimizes heat wave distortion inside telescope tube and allows telescope to adapt to ambient moisture conditions.

SUGGESTED READING

Amateur Astronomy

Beginner's Guide to Amateur Astronomy:

An Owner's Manual for the Night Sky by David J. Eicher and, Michael Emmerich (Kalmbach Publishing Co., Books Division, Waukesha, WI, 1993).

NightWatch: A Practical Guide to Viewing the Universe by Terence Dickinson, (Firefly Books, Willowdale, ON, Canada, 3rd edition, 1999).

Star Ware: The Amateur Astronomer's Ultimate Guide to Choosing, Buying, and Using Telescopes and Accessories by Philip S. Harrington (John Wiley & Sons, New York, 1998).

The Backyard Astronomer's Guide by Terence Dickinson and Alan Dyer (Firefly Books Ltd., Willowdale, ON, Canada, revised edition, 1994).

The Beginner's Observing Guide: An Introduction to the Night Sky for the Novice Stargazer by Leo Enright, (The Royal Astronomical Society of Canada, Toronto, ON, Canada, 1999).

The Deep Sky: An Introduction by Philip S. Harrington (Sky Publishing Corporation, Cambridge, MA, Sky & Telescope Observer's Guides Series, ed. Leif J. Robinson, 1997).

The Universe from Your Backyard: A Guide to Deep Sky Objects by David J. Eicher (Kalmbach Publishing Co., Books Division, Waukesha, WI, 1988).

Turn Left at Orion: A Hundred Night Sky Objects to See in a Small Telescope--and how to Find Them by Guy J. Consolmagno and Dan M. Davis, (Cambridge University Press, New York, 3rd edition, 2000)

Astrophotography

A Manual Of Advanced Celestial Photography by Brad D. Wallis and Robert W. Provin (Cambridge University Press; New York; 1984)

Astrophotography An Introduction by H.J.P. Arnold (Sky Publishing Corp., Cambridge, MA, Sky & Telescope Observer's Guides Series, ed. Leif J. Robinson, 1995).

Astrophotography for the Amateur

by Michael Covington (Cambridge University Press, Cambridge, UK, 2nd edition, 1999).

Splendors of the Universe: A Practical Guide to Photographing the Night Sky by Terence Dickinson and Jack Newton (Firefly Books, Willowdale, ON, Canada, 1997)

Wide-Field Astrophotography by Robert Reeves (Willmann-Bell, Inc., Richmond, VA, 2000).

Observational References

A Field Guide to the Stars and Planets by Jay M. Pasachoff, (Houghton Mifflin Company, 1999).

Atlas of the Moon by Antonín Růkl (Kalmbach Publishing Co., Books Division, Waukesha, WI, 1993).

Burnham's Celestial Handbook: An Observer's Guide to the Universe Beyond the Solar System by Robert Burnham (Dover Publications, New York; 3- volume set, 1978).

Observer's Handbook by The Royal Astronomical Society of Canada, (University of Toronto Press, Toronto, ON, Canada, published annually).

Sky Atlas 2000.0 by Wil Tirion and Roger W. Sinnott (Sky Publishing Corp., Cambridge, MA, 2nd edition, 1998)

Magazines

Astronomy Magazine (Kalmbach Publishing Co., Waukesha, WI)

Sky & Telescope Magazine (Sky Publishing Corp., Cambridge, MA)

SkyNews Magazine: The Canadian Magazine of Astronomy & Stargazing (SkyNews Inc., Yarker, ON, Canada)