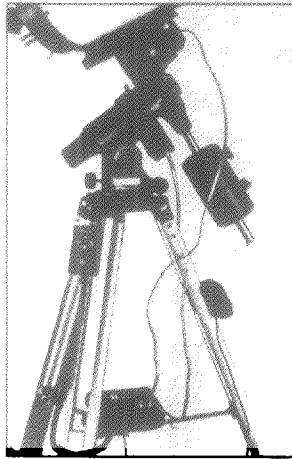


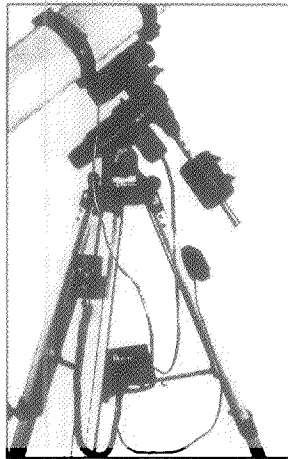
# Operating Instructions

## Meade® Model 1702 Dual-Axis Drive System

### For LXD 500A and LXD 500B Equatorial Mounts



**Fig. 1:** #1702 Dual-Axis Drive System (for Schmidt-Cassegrain and Refracting Telescopes).



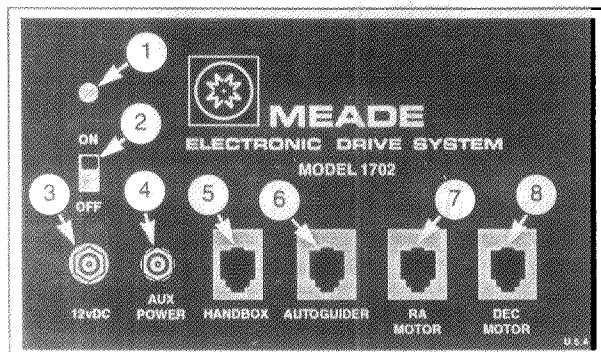
**Fig. 2:** #1702 Dual-Axis Drive System (for Newtonian Reflecting Telescopes).

The Meade Model 1702 Dual-Axis Drive System attaches easily and directly to the Meade Model LXD 500 Equatorial Mount. With the LXD 500 Equatorial Mount properly polar aligned (see the instruction manual which accompanies the telescope) and the #1702 system installed and activated, the telescope automatically moves at the correct rate to track any celestial object, keeping it centered in the telescope's field of view. The #1702 system also places precise microslowing capabilities in the hand of the observer. The dual-axis corrector offers four photo-guide or micro-slew speeds, allowing for the very small tracking corrections necessary during long exposure astrophotography, as well as the ability to micro-slew to and center on an object.

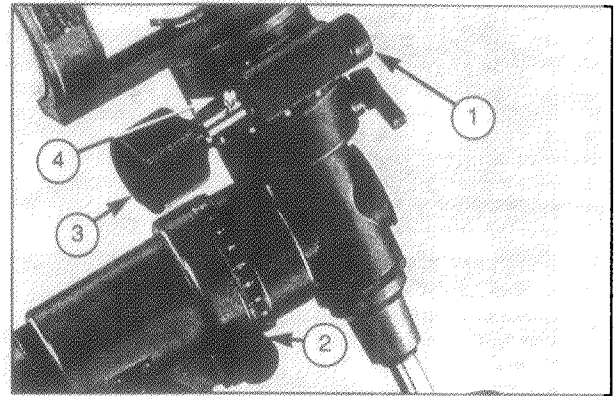
#### PARTS LISTING

When opening the packing box for the first time, note carefully the following parts included with the #1702 Dual-Axis Drive System:

- R.A. Motor Box
- Dec Motor Box
- Two Drive Motor Couplers (small, black cylinders)
- Two Flat Drive Cables
- Handbox
- Control Box
- 15vDC Battery Pack and Carrying Case
- Hardware Kit



**Fig. 3:** #1702 Dual-Axis Drive System Control Panel. (1) Red LED Light; (2) ON/OFF Switch; (3) 12vDC Port; (4) AUX Power Port; (5) Handbox Port; (6) Autoguider Port; (7) R.A. Motor Port; (8) DEC Motor Port.



**Fig. 4:** LXD 500 Equatorial Mount. (1) Dec Drive Connection Point; (2) R.A. Drive Connection Point; (3) Dec Slow-Motion Control; (4) Knurled Thumbscrew.

#### INSTALLATION

To attach the #1702 Dual-Axis Drive System on the LXD 500 Equatorial Mount, follow these steps:

1. Remove the #1702 Dual-Axis Drive System Control Box from the packing box. Place the Control Box on the accessory tray of the LXD 500 Tripod, with the Control Panel, Fig. 3, face up.
2. Remove the dust covers from the Dec and R.A. Drive Connection Points (1) and (2), Fig. 4, on the LXD 500 Equatorial Mount.



**Fig. 5:** Installing the Drive Motor Coupler.

3. From the packing box, remove the two small, black, cylindrical drive motor couplers. Slip one drive motor coupler into the shaft of the Dec Drive Connection Point (1), Fig. 4. (See Fig. 5.) Gently pushing in on the coupler, slowly rotate the Dec Slow-Motion Control (3), Fig. 4, until

the drive motor coupler slips into position in the shaft. When correctly installed, about 1/8" of the coupler is visible.

Insert the second drive motor coupler into the R.A. Drive Connection Point (2), Fig. 4, as far as it goes. Then, gently pushing in on the coupler, slowly rotate the R.A. Slow-Motion Control until the coupler slides into position.

4. Locate the R.A. and Dec Drive Motor boxes within the packing box. To identify the boxes, locate the identification label near the encoder port (4), Fig. 6, and (4), Fig. 7, of each box.
5. Slightly unthread the set screws on the R.A. Drive Motor box and place the box onto the R.A. Drive Connection Point (2), Fig. 4, (with the drive motor coupler in place). The R.A. Drive Motor box should be installed perpendicular to the Polar Axis (6), Fig. 6, with the majority of the box hanging down and the R.A. Setting Circle (2), Fig. 6, visible. Holding the R.A. Drive Motor box on the shaft, slowly rotate the R.A. Slow-Motion Control until the motor slips into position. Tighten the set screws using the provided hex wrench.

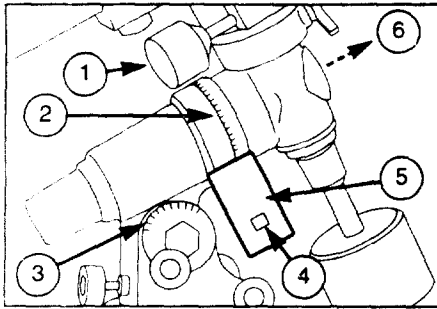


Fig. 6: Mounting the R.A. Drive Motor. (1) Dec Slow-Motion Control; (2) R.A. Setting Circle; (3) Latitude Scale; (4) Encoder Port (5) R.A. Drive Motor; (6) Polar Axis.

**NOTE**

It is important to note the orientation of the R.A. Motor in Fig. 6. Incorrect installation of the motor may cause damage to the motor, mount, or telescope.

**NOTE:** The AUX Power port (4), Fig. 3, provides output DC voltage equal to the voltage being supplied to the telescope.

12. The Autoguider port (6), Fig. 3, allows direct interfacing with Meade CCD autoguider equipment such as the Pictor 201XT camera to accomplish autoguiding for astrophotography.
13. To apply power to the system, move the "ON/OFF" switch (2), Fig. 3, to "ON", illuminating the red LED light (1), Fig. 3. When power is switched "OFF," the LED light turns off.

**GETTING STARTED**

To utilize the #1702 system during an observing run, follow this procedure:

6. Slightly unthread the set screws on the Dec Drive Motor box and place the box onto the Dec Drive Connection Point (1), Fig. 4, (with the drive motor coupler in place). Note the correct orientation of the Dec Drive Motor in Fig. 7. Slowly rotate the Dec Slow-Motion Control until the Dec Drive Motor slips into position. Tighten the set screws using the provided hex wrench.
7. Unthread the knurled thumbscrew (4), Fig. 4, on the Dec Slow-Motion Control (3), Fig. 4, and remove the slow-motion control knob from the mount. Repeat the process with the R.A. Slow-Motion Control. **The manual slow-motion controls cannot be utilized when the #1702 Dual-Axis Drive System is attached to the LX D 500 Equatorial Mount.** Slow-motion control is provided through the Handbook, Fig. 8, and is discussed below.

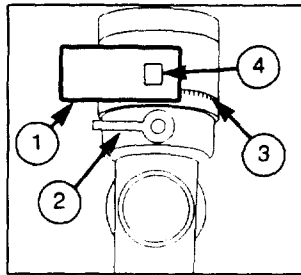


Fig. 7: Mounting the Dec Drive Motor. (1) Dec Drive Motor; (2) Dec Lock Lever; (3) Declination Setting Circle; (4) Encoder Port.

1. **Polar align your telescope.** See the instructions that accompany the telescope.
2. Level the tripod, using the bubble level located on the top of one tripod leg as a guide. Center the bubble inside the small, inner circle of the level.
3. Turn on the #1702 Dual-Axis Drive System. When power is first supplied to the system, four LEDs (3), Fig. 8, on the Handbook will light up several times in rapid succession, indicating the drive system is performing a self-diagnostic test. Once the test is complete, the LED next to 32X will remain illuminated.
4. Unlock the R.A. and Dec lock levers on the LX D 500 mount and locate an object to be observed.
5. Manually center the object in the telescope's field of view. Then, lock the R.A. and Dec lock levers to secure the telescope in position. Utilize the direction keys (1), Fig. 8, on the Handbook to more precisely center the object. (The various functions of the Handbook are discussed below.)
6. After the R.A. and Dec lock levers are locked, the drive motor engages and begins tracking, keeping the centered object in the field of view of the telescope without the need for constant manual adjustments.

It is not necessary to turn off the #1702 system when moving from object to object. By unlocking the R.A. and Dec lock levers on the LX D 500 mount, the drive motors are dis-engaged, allowing free movement of the telescope in Right Ascension and Declination. When the lock levers are locked, the drive motors re-engage and the Handbook, Fig 5, must be utilized to move the telescope in Right Ascension or Declination

**NOTE:** The telescope is moving very slowly and its motion can not be seen visually. However, when viewing through the telescope, this motion is easily noticeable. For a demonstration of the telescope's tracking movement, turn off the #1702 system for a few seconds while observing and notice how quickly the object drifts out of the field of view.

**CAUTION!**

**Removal of the Dec and R.A. Slow-Motion Controls is absolutely necessary to prevent possible damage to the drive motors, mount and telescope.**

8. Locate the two interchangeable drive cables in the packing box. Attach one end of a cable to the encoder port (4), Fig. 7, on the Dec Drive Motor (1), Fig. 7. Attach the other end of the cable to the Dec Motor port (8), Fig. 3, on the Control Panel.
9. Attach the remaining drive cable to the encoder port (4), Fig. 6, on the R.A. Drive Motor (5), Fig. 6. Attach the other end of the cable to the R.A. Motor port (7), Fig. 3, on the Control Panel.

**NOTE:** Confirm that the Dec Motor cable is attached to the Dec Motor port on the Control Panel and the R.A. Motor cable is attached to the R.A. Motor port on the Control Panel. Do not cross the cables or the #1702 system will not function properly.

10. Attach the coiled cord from the Handbook, Fig. 8, to the Handbook port (5), Fig. 3 on the Control Panel.
11. The #1702 Dual-Axis Drive System is powered by 10 (user supplied) AA batteries. After installing the batteries in the battery pack, plug the cord from the battery pack into the 12vDC port (3), Fig. 3, on the Control Panel. **(If the #1702 system is not to be used for an extended period (one month or more), it is advisable to remove the batteries from the battery pack.)**

The acceptable input voltage range is 12-18vDC.

**HANDBOX: NORMAL OPERATIONS**

**Direction Keys** (1) Fig. 8: Four keys, labeled N, S, E, and W on the Handbook, are used to move, or microslew, the telescope in a specific direction. When pressing a direction key, the only feedback is the motion of the telescope.

**SPEED Key** (2), Fig. 8: The **SPEED** key, is used to adjust the speed at which the telescope moves when pressing one of the direction keys. The current speed is indicated by one of four LEDs (3), Fig. 8, located next to the **SPEED** key.

Pressing the **SPEED** key cycles the Handbook through the following speed options:

- 32X sidereal rate - for centering the object in the viewfinder.
- 16X sidereal rate - for centering the object in a wide-field eyepiece.
- 8X sidereal rate - for centering the object in a high-power eyepiece.
- 2X sidereal rate - for guiding during astrophotography.

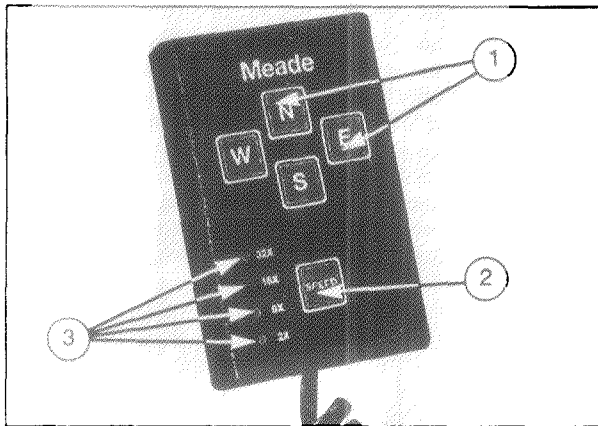


Fig. 8: Handbox. (1) Direction Keys; (2) SPEED Key; (3) LED Indicator Lights.

**NOTE:** All of the slow speeds drive the telescope in the East or West directions, except for 2X. When pressing the E key (for northern hemisphere operations) or the W key (for southern hemisphere operations) with the 2X sidereal speed selected, no movement from the telescope motor can be heard because the 2X sidereal speed stops the tracking motor, allowing Earth's natural rotation to make minor adjustments to objects in the telescope's field.

### HANDBOX: SPECIAL FUNCTION MENU

It is possible to customize the operation of the #1702 system by changing up to four of the following functions: Northern/Southern Hemisphere Operations (southern hemisphere operations requires that the motor turn in the opposite direction from northern hemisphere operations); Reversing the E/W Key Direction; Reversing the N/S Key Direction; Changing the Tracking Rate.

**To enter the Special Function Menu:** Hold down the E and W keys for 2 seconds.

**To move between functions:** use the N and S keys.

**To select or change a function:** use the SPEED key.

**To exit the Special Function Menu:** press the N key until all four LEDs blink in pairs and then press the SPEED key. This action returns the telescope to normal operation with the customized changes in place. When power is turned off, all of the functions revert back to their default settings.

**A. Northern/Southern Hemisphere Operation:** The #1702 system was designed to operate from either the northern or southern hemispheres. The #1702 system is set for northern hemisphere operations when shipped from the factory. There are two methods for changing the system's hemisphere of operation:

**Long term changes:** If your primary observing site is located in the southern hemisphere, the default setting may be changed by removing the panel from the back of the Control Box. On the circuit board (visible with the small back panel removed), locate two "L" shaped jumpers extending up from the circuit board. By connecting the two "L" shaped jumpers (e.g., wrapping a bare wire around the two jumpers), the default setting becomes the southern hemisphere.

**Temporary changes:** The hemisphere default can be temporarily changed from the Handbox. This change is in effect as long as power is supplied to the telescope. When power is turned off, the system reverts back to the default hemisphere setting. To change the hemisphere of operation:

1. Enter the Special Function Menu by pressing the E and W keys simultaneously for two seconds.

2. Use the N or S key to move to the 32X LED.
3. The LED blinks slowly to indicate northern hemisphere operation or rapidly for southern hemisphere operation.
4. Pressing the SPEED button toggles between the two hemisphere settings.
5. Exit the Special Functions Menu - see step (E).

**B. Reversing the E / W Key Direction:** When guiding for an astrophoto, it is often desirable to reverse the direction of the telescope in East and West movements (e.g., pressing the W key, the telescope moves East). To make this change:

1. Enter the Special Function Menu by pressing the E and W keys simultaneously for two seconds.
2. Use the N or S key to move to the 8X LED.
3. Press the SPEED key. The 8X LED will blink quickly indicating the buttons have been reversed.
4. Pressing the SPEED key toggles between these two settings.
5. Exit the Special Functions Menu - see step (E).

**C. Reversing the N / S Key Direction:** To reverse the direction of the #1702 system in the North and South movements (e.g., pressing the N key, the telescope moves South), follow these steps:

1. Enter the Special Function Menu by pressing the E and W keys simultaneously for two seconds.
2. Use the N or S key to move to the 16X LED.
3. Press the SPEED key. The 16X LED will blink quickly indicating the buttons have been reversed.
4. Pressing the SPEED key toggles between these two settings.
5. Exit the Special Functions Menu - see step (E).

**D. Changing the Tracking Rate:** The Moon, comets, asteroids, etc., may travel faster or slower than the standard tracking rate. To compensate, the tracking rate of the #1702 system may be adjusted in increments of 0.5% by following these steps:

1. Enter the Special Function Menu by pressing the E and W keys simultaneously for two seconds.
2. Use the N or S key to move to the 2X LED.
3. Pressing the SPEED key activates the tracking rate mode for input and turns off all four LEDs.
4. Press the N key one time for each 0.5% speed increase (the 32X LED will blink once for each key press) or the S key for each 0.5% speed decrease (the 8X LED will blink once for each key press).
5. Press the SPEED key to complete the adjustment. When the SPEED key is pressed, the 32X or 8X LED will blink once for each 0.5% adjustment entered, confirming the number of adjustments, and then return to the Special Function Menu, with the 2X LED quickly blinking to indicate the tracking rate has been adjusted.

**Tracking the Moon:** To set the tracking rate for observing the Moon, decrease the normal rate by pressing the S key 4 to 6 times.

**Tracking Comets, Asteroids, etc.:** Each comet and asteroid travels around the Sun at a different speed, thus requiring a unique tracking rate. Experiment with different rate settings while observing to determine the proper setting.

6. Exit the Special Functions Menu - see step (E).

**NOTE:** Whenever tracking speed changes are requested, they are made relative to the standard speed - NOT relative to the last adjusted speed.

**E. Exiting the Special Function Menu:** To exit the Special Function Menu, press and hold the **N** key until all four LEDs blink in pairs. Then press the **SPEED** key. This action will return the telescope to normal operation.

**#1702 Dual-Axis Drive System Handbook  
Special Function Menu Summary**

| LED | Function                            | LED Blinking Slow              | LED Blinking Fast       |
|-----|-------------------------------------|--------------------------------|-------------------------|
| 32X | Change Northern/Southern Hemisphere | Northern Hemisphere            | Southern Hemisphere     |
| 16X | Reverses N/S Key                    | N = N<br>S = S                 | N = S<br>S = N          |
| 8X  | Reverses E/W Key                    | E = E<br>W = W                 | E = W<br>W = E          |
| 2X  | Change Tracking Rate                | Indicates Normal Sidereal Rate | Indicates Adjusted Rate |

**PRECISE POLAR ALIGNMENT**

The LXD 500 mount has a provision in its polar axis for the addition of the optional #812 Polar Alignment Finder. The #812 Finder dramatically increases the accuracy of the polar alignment process, thereby decreasing the number of tracking corrections needed to keep an object exactly centered in the field of view. Precise polar alignment is essential for long-exposure astrophotography (typically defined as photo-exposures of 10 minutes or longer). The #812 Polar Alignment Finder is available through your Meade dealer.

**FCC NOTICE**

This equipment has been tested and found to comply with the limits for a CLASS A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**MEADE LIMITED WARRANTY**

Every Meade telescope, spotting scope, and telescope accessory is warranted by Meade Instruments Corporation ("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 by calling (714) 451-1450. 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 can not 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.



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