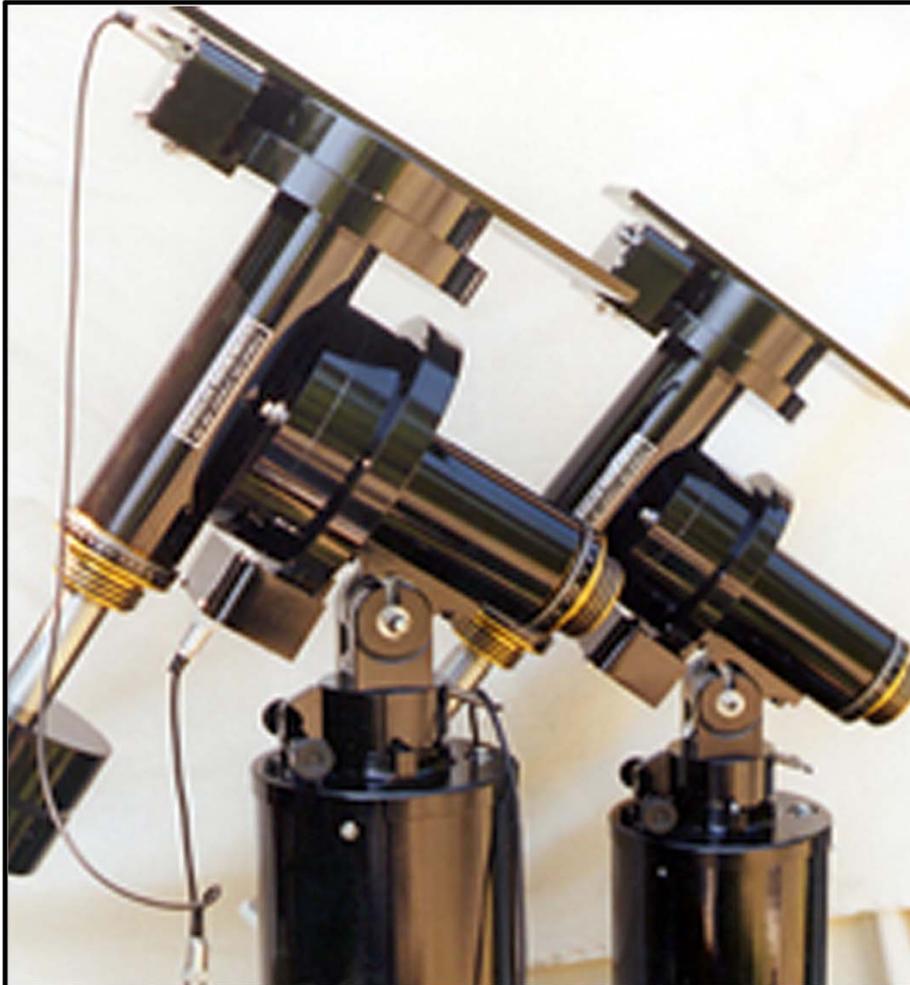


PARALLAX INSTRUMENTS, INC.

**HD 200 STANDARD GERMAN EQUATORIAL
HD 150C GTO GERMAN EQUATORIAL
HD 200C GTO GERMAN EQUATORIAL**



HD 200C GTO

HD 150C GTO

Parallax Instruments, Inc.

P.O. Box 303 Montgomery Center, VT 05471 (802) 326-3140

OPERATION MANUAL

Parallax Instruments, Inc.

Operation Manual

This manual will guide you through the steps in the mechanical set up of your new Parallax Instruments, Inc. German equatorial mount. The manual for set up of the electronics, whether the mount is equipped with either full GO TO capability or standard digital drives is also provided under separate cover. The HD 200 standard, the HD 150C GTO, or the HD 200C GTO, are equipped with only the very finest Byers "Starmaster" gears and precision spring-loaded worms to obtain superb tracking accuracies with extremely small periodic error.

ASSEMBLY OF THE PORTABLE PIER

Figure 1 shows the 10" diameter portable aluminum pier broken down into its components. The pier is designed to be assembled without any tools. Included are:

- 3 heavy duty cast aluminum pier legs with leveling pads
- 2 fine adjust azimuth knobs
- 2 fine adjust altitude (or latitude) knobs
- 2 pier fork tine lock down knobs
- set of 6 knobs and stainless steel washers for locking the pier legs to the pier column

On top of the pier cap is the pier fork tine, which accepts the polar housing assembly. More on this to follow.

Figure 2 shows how to attach a pier leg to the pier column.

1. Slip a leg over the 2 threaded studs in the pier column
2. Install the washers and knobs and lock down
3. Repeat this step for the other 2 legs

At this point, the pier should now be free standing. Leveling of the pier can be performed at a later time by screwing or unscrewing the leveling studs. It is important to note that for maximum strength the 3 leveling pads should be as close as possible to the bottom of the pier leg pads.



Figure 1

The portable pier in component form



Figure 2

Installing the pier legs.

THE EQUATORIAL HEAD

Figure 3 shows the complete equatorial head broken down in its individual components. The mounting breaks down in minutes into easily handled sub-assemblies. Shown is:

- the polar housing assembly,
- the declination housing assembly,
- saddleplate,
- stainless steel counterweight shaft,
- counterweights,
- and (2) 3/8-16 stainless steel socket head bolts for joining the polar and declination housing assemblies.

MOUNTING THE POLAR HOUSING ASSEMBLY ON THE PIER

Before installing the polar housing assembly, unscrew the stainless steel handles located on either side of the polar housing tongue a bit. Lower the polar housing assembly while positioning the polar housing assembly tongue into the pier fork tine. **(Figure 4)** You may also need to unscrew the (2) altitude adjust knobs on the pier fork tine slightly to allow the altitude adjust post to clear the altitude adjust studs. Once the polar housing assembly is inserted into the pier fork tine, you may tighten the stainless steel handles as tight as possible by hand.



Figure 3

Equatorial head in component form



Figure 4A

Polar housing assy. installed



Figure 4

Installing the polar housing
assy.

MATING THE DECLINATION HOUSING ASSEMBLY TO THE POLAR HOUSING ASSEMBLY

1. Rotate the polar housing assembly thrust disc so that the (2) 3/8" diameter steel alignment pins are at the 12 O'clock and 6 O'clock positions, i.e. straight up and down. (It might be easier to loosen the polar clutch knob a bit to make this easier.)
2. Grasp the declination housing assembly and position it so the (2) 3/8" diameter clearance holes located in the declination mating disc line up with the pins in the polar housing assembly thrust disc (**Figure 5**). The necessary clearance holes are located along the long axis of the declination housing assembly.
3. Now simply join the 2 housings together. With the declination housing now engaged in the alignment pins and the declination axis clutch knob now pointing toward the ground, the mount will stay together.
4. To avoid any accidents, immediately screw in the (2) 3/8-16 stainless steel socket head bolts (**Figure 5A**) that securely attach both housings with the socket wrench provided.

To avoid the now assembled declination housing assembly from rotating, it is a good idea to now re-tighten the polar clutch knob.



Figure 5

Installing the declination housing assy.



Figure 5A

Bolting down the declination housing assy.

INSTALLING THE COUNTERWEIGHT SHAFT AND COUNTERWEIGHTS

Simply screw in the 2" diameter stainless steel counterweight shaft to the threaded stud located at the end of the declination shaft located at the base of the declination clutch knob (**Figure 6**). Lock down hand tight. Now slide a counterweight up the counterweight shaft and lock down using the provided knob (**Figure 6 A**). You will notice that a brass pin is used to contact the counterweight shaft when locking. This is to avoid marring of the counterweight shaft. Screw on the white nylon counterweight safety stop.



Figure 6

Installing the counterweight shaft



Figure 6 A

Installing the counterweights

INSTALLING THE SADDLEPLATE

Depending on the length, some saddleplates may be shipped loose. If this is the case, simply bolt the saddleplate to the top of the declination housing assembly thrust disc using the (4) 1/4-20 stainless steel socket head bolts provided (**Figure 7**). Please be certain that the (4) bolts go through the top of the saddleplate. The top is the side with the counterbored holes. If a Losmandy dovetail type saddleplate is provided, there will (2) 5/16-18 tapped holes at 3.00" on centers in the declination thrust disc for this purpose.



Figure 7

Bolting down the saddleplate



Figure 8

Fully assembled mount

GEAR CLEARANCE

As important to any mount as its sophisticated electronics is making certain that the mesh between the worm wheel and its matching worm is of the proper clearance. Correct gear clearances are of the utmost importance if one is to obtain the tracking and pointing accuracies of today's equatorial mountings. Variables such as extreme winter cold and intense summer heat will cause the alloy 7075 aluminum worm wheel and its matching stainless steel worm to contract and expand at different rates. Such unavoidable variables can cause the two gears to jam which leads to poor tracking, less than precise pointing, and premature wear. As mentioned previously, the worm used on your Parallax mount has been equipped with a spring-loading mechanism, which aids greatly in alleviating this problem. The gear clearance of your mount is set here at our facility and although adjustment bolts are provided, should not require further adjustment.

A WORD ABOUT CLUTCH TENSION

All of our mounts are provided with clutched axes. The clutch consists of a Delrin disc with one surface contacting the face of the worm wheel and the other surface contacting the thrust disc. Many people wrongly feel the need to be able to "lock-up" the axes on a mount. Only moderate clutch tension will be all that is required. Again, we set the clutch tension here at our facility. Resist the desire to over tighten as this can lead to excessive wear on the mount's mechanical components. It should also be pointed out that mounts equipped with full GO TO capability are designed to be slewed via their electronics rather than the sometimes jerky, uneven motion of a manually slewed system.

USING THE FINE ALTITUDE AND FINE AZIMUTH ADJUST KNOBS

In order for the mount to accurately track and automatically point (if equipped with the GTO electronics) to a selected celestial object, the polar axis of the mount must be precisely aligned to the polar axis of the earth's rotation. For casual observing, aligning to Polaris will be adequate, but exact polar alignment will be required to take full advantage of the mount's sophisticated gears and electronics. Procedures for exact polar alignment are discussed at length in the accompanying GTO electronics manual.



Figure 9

Location of adjustment knobs

Located on the pier fork tine are (2) opposing altitude adjust knobs. Located on the pier cap are (2) opposing azimuth adjust knobs. To make fine adjustments, simply loosen one knob and tighten the opposing knob. (Figure 9 Location of adjustment knobs) Located also on the pier fork tine barrel are (2) lock down knobs. These should be loosened just slightly before adjusting in azimuth. Once fine azimuth adjustment has been made, tighten these (2) lock down knobs.

LUBRICATION AND MAINTENANCE

Initial lubrication of all bearings and gears is performed at our facility but like any mechanical device, over time, it is a good idea to provide fresh lubrication depending on usage and observing conditions. A good white Lithium grease will work fine. The use of a fine thin paintbrush works well in applying new lubricant to the worm wheel and worm. Take care in avoiding any bristles or other dirt particles getting in the worm wheel teeth. Upon disassembly of the equatorial head, the tapered roller bearings can also be provided with new lubricant. It is wise to remove the old contaminated lubricant on the bearings and their inner cups by using a solvent such as lacquer thinner before applying new lubricant. While the mount is apart, be certain to clean both sides of the Delrin clutch discs of any grit or dirt before reinstalling. Avoid getting any lubricant on the clutch discs. It is also a good idea to periodically check that the setscrews on the spur gears are tight.

If for any reason you feel you require further assistance in the operation and care of your new mount, please contact us. We are here to help.

Joe Nastasi

Owner, Parallax Instruments, Inc.