

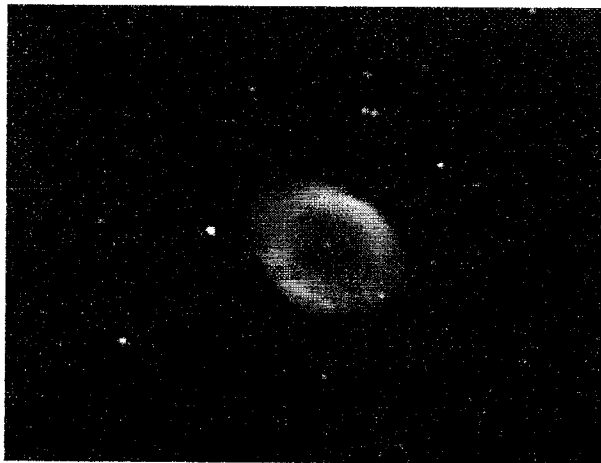
Gemini G-40 German Equatorial Telescope Mount

User's manual

Main features and parameters

- **Capacity:** approximately 30 ± 5 kg, depending on tube length.
- **Weight:** 30 kg
- **Power:** the unit needs 2.5 Ampers minimum at 12 V DC. An underrated or unstable power source will cause malfunctioning of the drive system.
- Precision dual axis drive system with 1000 step stepper motors
- Hand control unit with 8 selectable speeds, Lunar, Siderial and Solar tracking
- Optional motofocus
- Pulsing polar illuminator LED
- Wide range of polar elevation adjustment
- Adjustable slip clutch
- Removable counterweight shaft (32 ± 0.2 mm diameter)

A precision **drive system** comprising ground steel worms, large 217 mm brass gears and a microstepped stepper motor is standard. Tracking accuracy is within 5 arcseconds total during several turns of the gear.



5x35 sec integration with ST5-C camera, 14 inch F/6 Newtonian (2100 mm F.L.), unguided G-40

G-40 German Equatorial mount

Safe use

Make sure that the power source used is stable! Noisy power will cause malfunctions and may eventually damage the circuits. The safest is to use a well charged battery.

Always connect the DEC motor and Hand Controller first, then the power! Doing otherwise will result in erroneous operation.

When turning the telescope, watch the cable of the declination motor! It should never be stressed!

Keep the mount away from dust, sand and other kinds of dirt! Protect it from rain!

The mount should NEVER rest on the motors or gear housing when stored or transported!

Troubleshooting

Drive does not start.

Incorrect polarity, insufficient current, unstable/noisy power, broken power cable, electronic transient, fuse blown (4A).

Drive stops while the LED on the control box is on.

Poor contact at alligator clips or elsewhere. Improve contact! * Insufficient current. Battery needs charging. * Electric transient. Disconnect power and connect again!

Motors vibrate and do not turn the telescope.

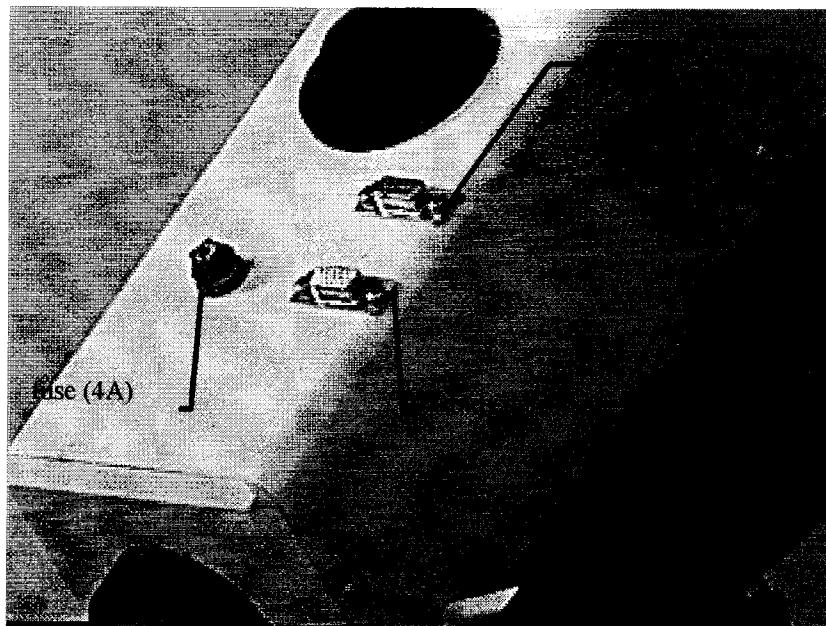
Large unbalanced mass. Rebalance the telescope! * Foreign particles (sand, etc.) at the gear. Clean the gears! Use Molybden enriched grease for lubrication! * Motor cables broken. Repair or replace!

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Setup

1. Connect the DEC motor and the Hand Control Unit
2. Polar align. (if required)
3. Put the counterweight on
4. Mount the telescope
5. Release the slip clutches and carefully balance the telescope. (Remember that finders, guidescopes, large focussers may introduce significant unbalanced weight, especially with Newtonians.)
6. Connect to the power source

The mount is ready for use.



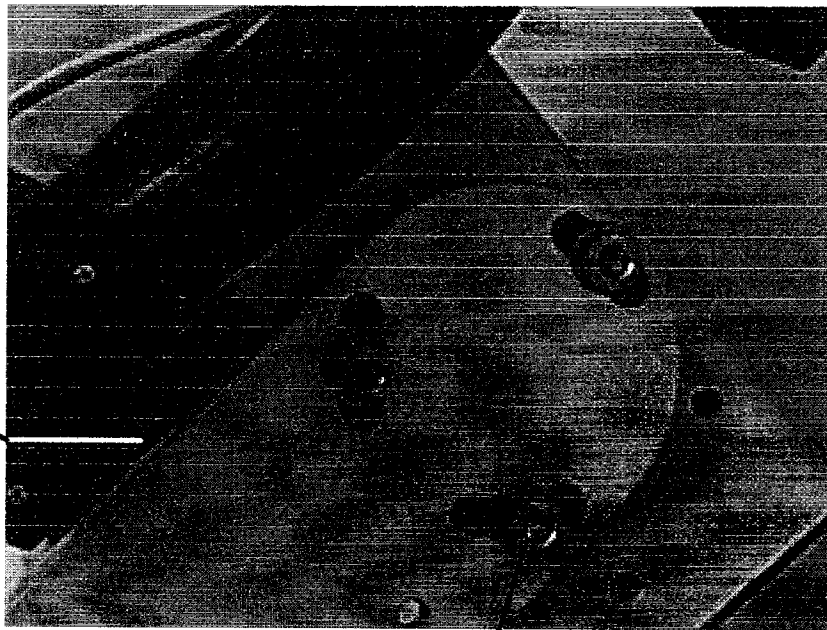
G-40 German Equatorial mount

Polar elevation

is adjusted after releasing the six screws (three on either side) fixing the polar axis. If more adjustment is necessary the screws shall be removed and the polar axis moved up or down until the next set of tapered holes match the arcs in the lugs. This should be done with the telescope and counterweight removed.

Use size 8 Hex tool for releasing the bolts! Tighten bolts gently!

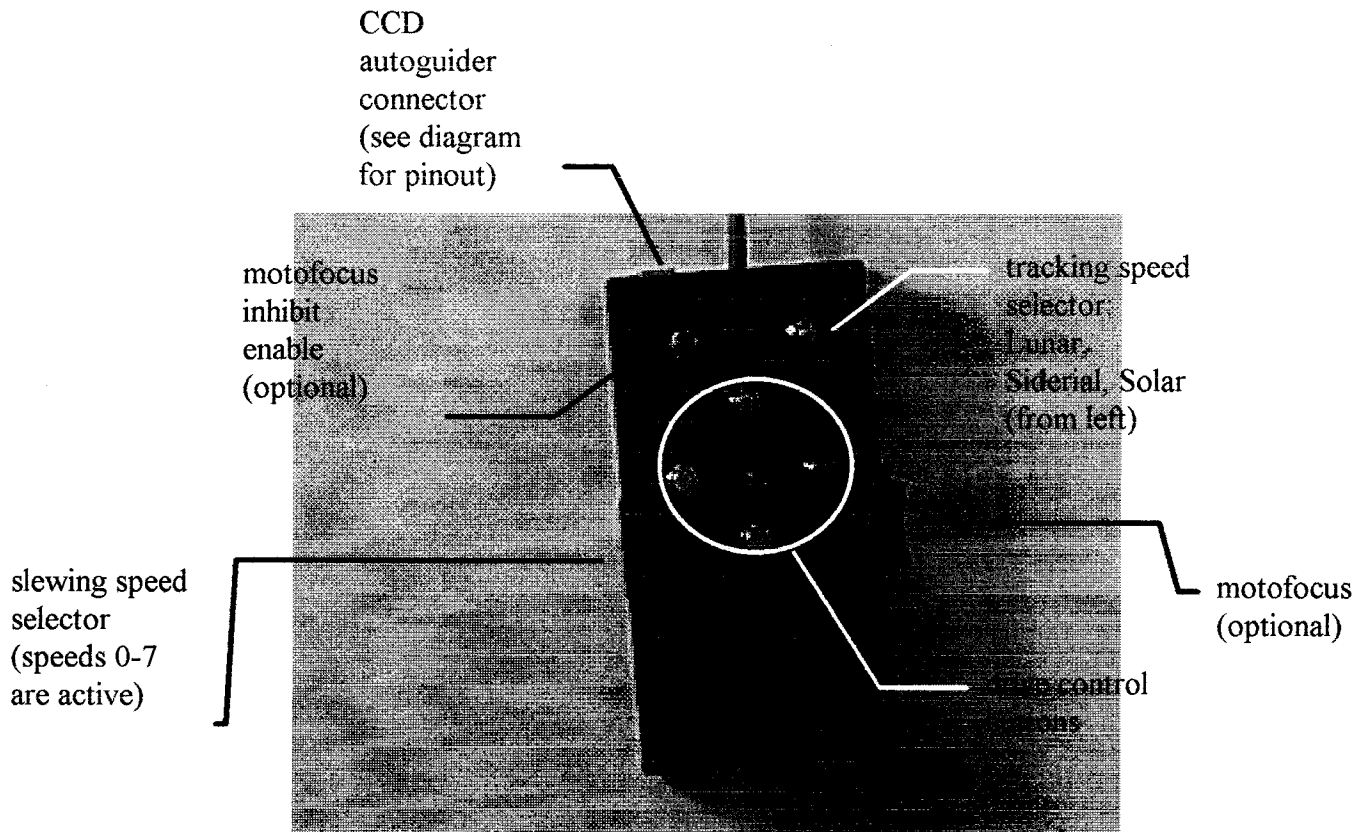
position of
elevation screw



these bolts are
to be released
a quarter turn
for polar
elevation

G-40 German Equatorial mount

Hand Control unit



You can use the hand control unit to

move the telescope by pressing the control buttons,

select the tracking rate of the drive system (solar O, siderial ●, lunar D) with the three position switch,

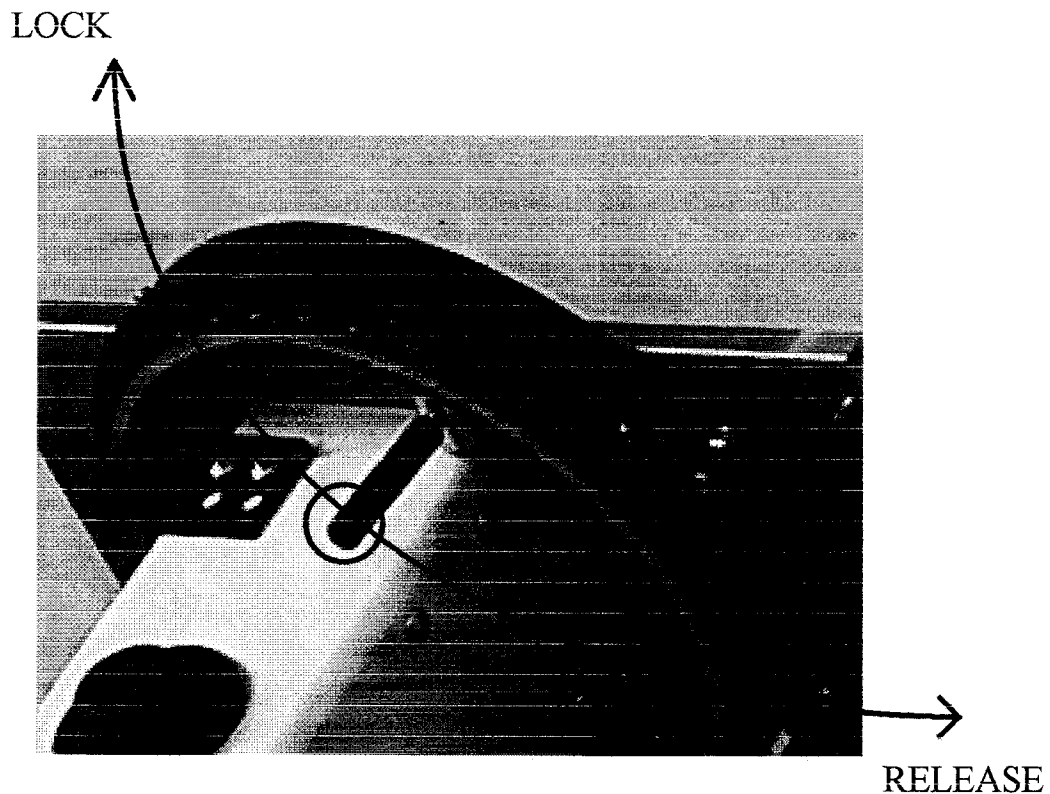
select one of 8 speeds (0 - 7) for setting or guiding on the wheel at the side of the box (0= tracking $\pm 15\%$, 1= 1 x tracking, 2= 2 x tracking, 3= 4 x tracking, 4= 8 x tracking, 5= 16 x tracking, 6= 32 x tracking, 7= 64 x tracking)

adjust focus by pressing the illuminated arrows at the side of the box (you need to connect a two phase stepper motor to the telecom cable, potentiometer controlled speed adjustment is provided inside the DEC axis, see drawing for details of access),

connect a CCD autoguider cable into the 6 pin socket (see diagram for pinout), the speed set on the wheel will be activated by the relays of the CCD, speed 1-3 is recommended.

G-40 German Equatorial mount

Slip Clutch Operation
(R.A. and DEC.)



Do NOT use excessive force on the locking bar! Lock it gently!

An unbalanced telescope may cause errors or failure of tracking.

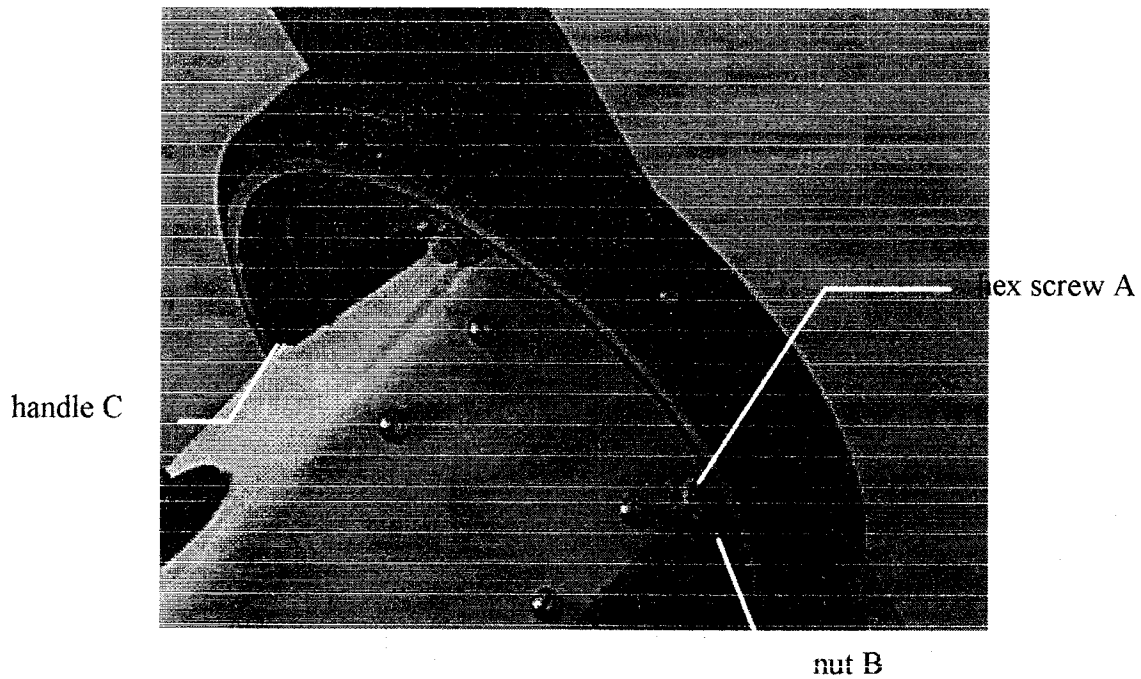
Please remember that the slip clutch is also a **protection feature** that prevents excessive forces from acting on the **worm and gear**! When the clutch is too tight and the telescope cannot slip when accidentally bumped, the worm and gear will suffer damage.

G-40 German Equatorial mount

Slip Clutch adjustment

Wear of moving parts may necessitate readjustment of the slip clutch. This is done in three steps.

1. Release hex screw *A*! (size 2,5)
2. Tighten nut *B* just until the mount is still easily rotated in the open position of the clutch handle *C*! Use a size 10 Open Wrench!
3. Gently tighten hex screw *A*!



G-40 German Equatorial mount

Tracking accuracy

The precision ground worm of the G-40 is driven directly by a stepper motor which eliminates most part of periodic error. The accuracy of the drive system is within 5 arcsecs for several worm rotation (one rotation is 3,3 minutes).

However, since a 1 micron error at the gear results in 2 arcsec tracking error, factors like

- small particles of dirt in the grease,
- small unbalanced forces,
- CCD and other cables on the tube,

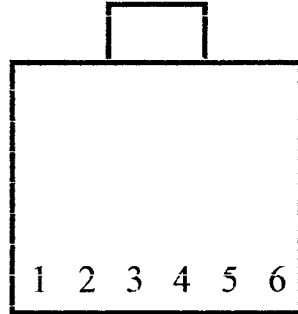
may lead to errors of approximately 10 arcsec occasionally. Even slight wind buffs will influence accuracy.

The long term accuracy of the drive is guaranteed by a Quartz Oscillator accurate to four digits.

To achieve maximum tracking accuracy we recommend that balancing is made as accurate as possible and any cables are secured near the R.A. shaft and not hang off the tube!

G-40 German Equatorial mount

CCD Autoguider connector pinout



1. positive
2. R.A. (W)
3. R.A. (E)
4. DEC
5. DEC
6. positive