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C11 & CGE PRO

C11 is our second largest telescope and suitable for mobile use. For this it has to be reconstructed each time. To display and describe the details of this process is the purpose of this article.

Scattered pieces

To protect the sensitive electronics from weathering conditions they are stored in the lab course room. The remaining mechanical parts stay in the, so one must not carry them around every time.

Stored in the dome:

1. the tripod
2. the tube (C11)
3. counterweights + bar

Stored in lab course room:

1. CGE PROs electronic box
2. CGE PRO mounting
3. box containing all 1.4″ oculars and small pieces
4. sun filter

Setup

1. The CGE PRO uses a parallactic mount and has to be adjusted to the northern direction. Therefore the tripod (see figure 1) should be positioned accordingly. To do so it is usually sufficient to point the tripod leg with the carrier for the hand terminal to the south.
2. Now put the electronic box on the tripod (see figure 2) and fix it using three bolts (see figure 3).
3. For the next step place the mounting mechanic of the CGE PRO (see figure 4) on the electronic box and again fix it using three bolts (see figure 5). Due to the heavy weight of the mounting this step should be performed by two people.
4. Screw the counterweight bar into the mechanic and place the counterweights on it (see figure 6). When you fasten the screews on them, they are hold in place
5. Connect the electronic box to the engines of the mount. The cables <see imgref cables> go in the ports on the side of the electronic box figure 8 and have different length. The short one connects to the axis controlling the rec-ascension the longer one is for the declination (see figure 9). The cable only fit in one position.
6. Now plug in the energy supply (see figure 10) and the terminal (see figure 11) into the

corresponding ports (see figure 12).

7. The placement of the tube should be performed by to people, too. One holds the tube in move is into mounting (see figure 13 and figure 14) and holds it in place, And the other tightens the screws (see figure 15).
8. Remove the cover from the tube (figure 16) and add, if needed, the sun filter (see figure 17).
9. Now you can attach an ocular, a camera or a spectrograph to the tube. To use 2″ oculars or one of the other instruments you need to exchange the 1.4″ adapter at the end of the tube by a 2″ adapter from the storage container.
10. Usually a focal reducer is already attached. If you don't want to use it, it has to be exchanged and a ocular adapter.
11. Before using the telescope u have to tare the rotation axis. First lose the bolts fixing the rectascension axis, until you can freely move the telescope along this axis. Now adjust the position of the counterweights such that there is now movement along this axis any more. Tighten the bolts again and repeat this procedure for the declination axis. As there are now counterweights now, to taring the declination axis shift the tube in the mounting. Again this should be done by to people
12. Done! (figure 18)

Fig. 1: CGE PRO tripod

Fig. 2: tripod with electronic box (the red circles indicate the three bolts to be fastened)

Fig. 3: One of the electronic box bolts

Fig. 5: CGE PRO mounting on electronic box and tripod (the red circles indicate the three bolts to be fastened)

Fig. 4: CGE PRO

Fig. 6: CGE PRO with counterweights on bar

Fig. 7: cable for the connection of electronic box and the engines

Fig. 8: electronic box with ports for the cable to the engines

Fig. 9: CGE PRO with the cable attached

Fig. 12: ports for power supply (left) and terminal (right) at the electronic box

Fig. 10: mobile power supply and cable reel

Fig. 11: terminal

Fig. 13: dove tail on the tube

Fig. 14: CGE PRO clamp on the mounting

Fig. 15: attachment of the C11 at the CGE PRO

Fig. 16: tueb with cover

Fig. 17: tube with sun filter

Fig. 18: completely build up telescope

Start-up

The CGE PRO can simply switched on and off via the `On/Off` switch at the electronic box. In contrast to the OST, the CGE PRO does not require any shutdown procedure. It simply can be switched off. After the boot of the mount, it is almost always required to perform an alignment. The following possibilities exist:

- Two Star Align
- One Star Align
- Solar System Align
- Quick-Align
- Last Alignment
- Re-Alignment

Unfortunately, the handling of the hand terminal of the CGE PRO is not as intuitive as the one of the OST. However, after a short settling in period also an inexperienced user can safely handle this mount.

Alignment

Usually it is required to create a new alignment after each setup of the mount. If one wants to use more than one night in a row, there is the opportunity to put the mount into a hibernation mode (see below) that allow to disconnect the mount from the power supply and at the same time to conserve the alignment. If the mount is used at a fixed position, one also can make use of a saved alignment.

General procedure:

1. switch on the mount
2. press *ENTER*to start the alignment procedure
3. press *ENTER* to allow the mount to move to the initial position (the co-called switch position)
4. enter the date
5. enter the time
6. select Daylight Savings time or Standard time
7. select the time zone (+1)
8. select the alignment method

In addition to the above settings one also has to set the location after a reset of the mount to the default settings. This can be done by selecting a location from a list of known locations or by entering the latitude and the longitude.

Solar System Alignment

The Solar System Alignment is useful especially for solar observations, since one can use directly to perform the alignment. While the precision of the Solar System Alignment is lower than what one can achieve with an alignment procedure that is based on several stars, it is usually sufficient for our purposes. Before the the can be used as an alignment star, it is required to allow the telescope to actually move to the sun, since this in blocked by default for security reasons. this can be done via

UTILITIES → *SUN MENU* → *ENTER*. Apart from the points mentioned above, the Solar System Alignment requires the following steps:

1. select *Solar System Align* (with the ↑ and ↓ buttons and **not** with the NSWO buttons)
2. select Sun in the menu and confirm it with *ENTER* ⇒ subsequently the telescope is moving the estimated position of the Sun
3. search for the Sun and center the Sun in the eyepiece (**Do not** use the finderscope as suggested by the software, since we do not have a solar filter for the finderscope!)
4. confirm with *ENTER*
5. press *ALIGN* ⇒ Finished!

Two-Star Alignment

The Two-Star Alignment and it refinement with additional stars is the default procedure to build a new alignment for night observations. Besides the points mentioned above the following steps are necessary:

1. select *Two Star Align* from the menu → subsequently, the telescope suggests bright stars, which are above the horizon
2. select and confirm the first calibration star with *ENTER*
3. center the star in the eyepiece (the finderscope is often not very helpful, since it is most of the time not well aligned with tube)
4. confirm with *ENTER*
5. press *ALIGN* → afterwards the telescope suggests the second alignment star
6. center also this star in the eyepiece (in case it is not possible to find the star, one can select a new stat by pressing *UNDO*)
7. confirm with *ENTER*
8. press *ALIGN* → subsequently, the alignment can be improved with additional stars (3 are recommended, 6 are possible)
9. press *UNDO* to complement alignment

Hibernation

The hibernation modus offers the possibility to use the telescope several nights in a row, while switching off the power supply during the day. The hibernation procedure ensures that the alignment will be conserved. However during hibernation, it is not allowed to move the telescope at all. The following steps are necessary to put the telescope into hibernation:

1. press the *MENU* button
2. select *HILBERNATE* from the *UTILITES* menu
3. move the telescope to the desired park position
4. switch off the telescope
5. disconnect the power supply and arrange for weatherproof cover (**Important:** do not move the telescope anymore!)

Wake up:

1. reconnect the power supply
2. switch on the telescope
3. confirm *Wake up* with *ENTER*
4. confirm the time and the location
5. The telescope is ready for the next observation!

Troubleshooting

Known error sources and their solutions can be found here.

Additional documentation

More details on the CGE PRO and the C11 can be found in the corresponding manuals in the lab course room.