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C11 & CGE PRO

The C11 is our second largest telescope and suitable for mobile use. Every time one likes to use it, one has to put it up again from scratch. The purpose of this article is to describe the details of this process.

Scattered pieces

To protect the sensitive electronics from humidity and other harsh weather conditions they are stored in the lab course room. The remaining mechanical parts stay in the dome, so that one does not need to carry them around.

Stored in the dome:

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

Stored in lab course room:

1. the CGE PROs electronic box
2. the CGE PRO mount
3. a box containing all 1.4" eyepieces and the corresponding filters
4. sun filters

Setup

1. The CGE PRO is a parallactic mount, which has to be adjusted to point to the northern celestial pole. 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 with three bolts (see [figure 3](#)).
3. Place the mechanics of the CGE PRO (see [figure 4](#)) on the electronic box and fix it again with three bolts (see [figure 5](#)). Due to the heavy weight of the mechanics, this step should be performed by two people.
4. Screw the counterweight bar into the mechanics and place the counterweights on it (see [figure 6](#)). When you fasten the screws on them, they are hold in place.
5. Connect the electronic box to the engines of the mount. The cables (see [figure 7](#)) go in the ports on the side of the electronic box ([figure 8](#)). The cables have different lengths. The short one connects electronic box with the right-ascension axis, while the longer one is for the

- declination axis (see [figure 9](#)). The cables only fit in one position.
6. Now plug the energy supply (see [figure 10](#)) and the hand terminal (see [figure 11](#)) into the corresponding ports (see [figure 12](#)).
 7. The attachment of the tube should also be performed by two people. One inserts the dovetail into the clamp of the mount (see [figure 13](#) and [figure 14](#)) and holds it in place. The other one 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 eyepiece, 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. Often a focal reducer is already attached to the telescope. It can be easily removed, if you don't want to use it.
 11. Before using the telescope you have to tare the rotation axes. First lose the bolts fixing the right-ascension axis, until you can freely move the telescope around this axis. Now adjust the position of the counterweights such that there is no movement along this axis anymore. Tighten the bolts again and repeat this procedure for the declination axis. As there are no counterweights for this axis, one has to shift the tube along the clamp to tare the declination axis. Again this should be done by two people.
 12. Done! ([figure 18](#))



Fig. 1: CGE PRO tripod



Fig. 2: Tripod with the electronic box (the red circle indicates one of the bolts that needs to be fastened)



Fig. 3: One of the bolts



Fig. 5: CGE PRO mounted on the electronic box and the tripod (the red circles indicate two of the bolts that need to be fastened)



Fig. 4: Mechanics of the CGE PRO

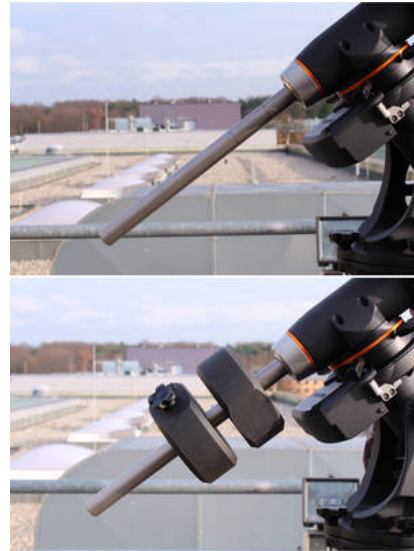


Fig. 6: CGE PRO with the counterweights on the bar



Fig. 7: Cables for the connection of the electronic box with the engines



Fig. 8: Electronic box with ports for the cables



Fig. 9: CGE PRO with the cable attached



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



Fig. 10: Mobile power supply and the cable reel



Fig. 11: Hand terminal



Fig. 13: Dove tail on the tube



Fig. 14: CGE PRO clamp on the mount



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



Fig. 16: Tube with the cover



Fig. 17: Tube with the sun filter



Fig. 18: Telescope build up completely

Start-up

The CGE PRO can simply be 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 create a new 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 even an inexperienced user can safely handle this mount.

Alignment

Usually it is required to create a new alignment after each start of the mount. If we want to use the telescope more than one night in a row, we have the opportunity to put the mount into a hibernation mode (see below) that allows 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 use a previously 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 so-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 sun can be used as an alignment star, it is required to allow the telescope to

actually move to the sun, since this is 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 NSW0 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 its 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 star 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 mode 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 *HIBERNATE* from the *UTILITIES* 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.

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Last update: **2017/10/21 21:49**

