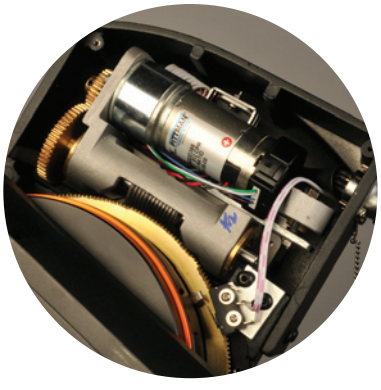
Dennis di Cicco

Celestron's CGE Pro Mount

The new CGE Pro is definitely a contender in the heavyweight category of German equatorial mounts.



Celestron CGE Pro German Equatorial Mount

US price: $4,999 including tripod and all cables
Available from Celestron dealers worldwide
www.celestron.com

Pictures can be deceiving — the new Celestron CGE Pro German equatorial mount seems bigger in person than it does in photographs. Even with the tripod in its lowest position (shown here), the middle of the telescope-mounting saddle stands 5½ feet (1.7 meters) above the ground. The mount is rated for loads of up to 90 pounds (41 kg), *not* including the counterweights. *Inset:* High-quality Pittman motors and large worm gears provide the driving force for the CGE Pro. The declination motor pictured here has a spring-loaded worm gear to reduce backlash, and the author found the declination drive to be exceptionally responsive during guiding. ALL PHOTOGRAPHS BY DENNIS DI CICCO

It took a nasty smack on the head to remind me how nice it is to work with a robust telescope mount. New England's abysmal weather last summer completely disrupted our product-review schedule, and I often spent the fleeting dark hours on rare clear nights testing multiple products simultaneously.

One evening while working with four new pieces of equipment, I failed to heed my own rule about moving cautiously around telescopes in the dark. Turning to grab an eyepiece, I slammed my forehead into the declination shaft of Celestron's new CGE Pro German equatorial mount. It more than hurt; it left a big mark that elicited good-natured ribbing from my colleagues in the following days. But after rubbing off the pain and returning to the telescope, I found the globular cluster M13 still dead center in the field of view. Remarkable! Most mounts would have been pointed light-years away and probably required a new polar alignment and sky initialization in order to resume Go To observing.

But the computerized CGE Pro is no lightweight mount. Indeed, with a rated load capacity of 90 pounds (41 kg), it's the biggest mount ever offered by the venerable West Coast telescope manufacturer, which is approaching its 50th anniversary. And while the CGE Pro is also the company's most expensive German equatorial mount, it's the lowest-cost model in its class, priced more than a thousand (and in some cases *thousands of*) dollars less than the competition. Put another way, the CGE Pro's cost per pound of load capacity is 40% lower than the average for Go To equatorial mounts rated for 70 to 100 pounds.

While the CGE Pro is ideal for permanent installation in an observatory, it's been engineered as a portable system. Not counting the 22-pound counterweights, the CGE Pro and tripod total 128 pounds, with the heaviest individual piece (the equatorial head) tipping the scales at 57 pounds. At a leisurely pace I could unpack the mount from my car and assemble it in well under half an hour. Another half hour spent during deep twilight was enough to complete two iterations of the mount's computerized polar-alignment routine, which doesn't require having a clear view of Polaris or the celestial pole. The process typically got me within 5 arcminutes of the pole — more than accurate enough for long-exposure imaging.

Most of the mount's electronics are housed in this 6-inch-diameter pier column. Cables for the drive motors, as well as the one for the external 12-volt DC power supply, use threaded connectors that prevent the cables from being accidentally pulled loose during use.

The CGE Pro's hand control is ergonomically designed and moderately intuitive to master. Many of the built-in utilities, such as the polar-alignment routine and sky initialization, have instructions that scroll across the backlit liquid-crystal display (LCD), so you don't need the manual in hand when performing the tasks.

I especially liked the mount's automatic change of slewing speeds when performing functions that involved

SPECIFICATIONS & MEASUREMENTS

Celestron CGE Pro	
Load capacity	90 pounds (41 kg)
Total weight (less tripod)*	86 pounds (39 kg)
Heaviest single component*	57 pounds (26 kg)
Tripod weight*	42 pounds (19 kg)
Tripod height*	38 to 55 inches (97 to 140 cm)
Power requirements*	12 volts DC, ~2½ amps maximum

* Value measured by *Sky & Telescope*

WHAT WE LIKE:

- Robust construction
- Accurate tracking and guiding
- Nice polar-alignment routine

WHAT WE DON'T LIKE:

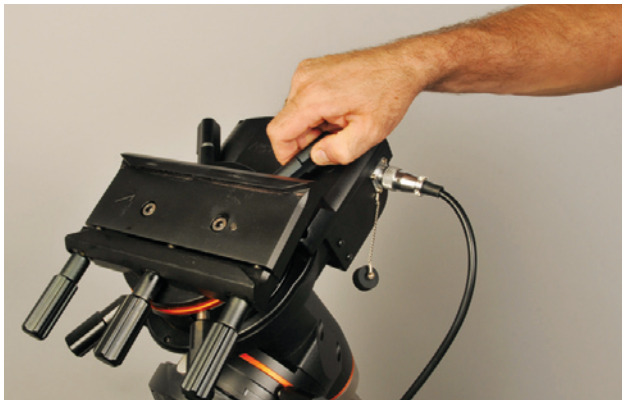
- Clutch handles can be difficult to grip
- No cable-management system

centering a telescope on an object. For example, when you are doing a star alignment, the CGE Pro initially slews at its top speed of 5½° per second to the position of the chosen star, and then it automatically changes to a slower slewing speed so you can manually center the star in your finder using the hand-control buttons. When you acknowledge that's been done (by pressing the Enter button), the scope automatically drops to an even slower slewing speed so you can finish the process by centering the star in the telescope's eyepiece. Very nice.

The hand control has all the functions we've come to expect of a high-end Go To system. There's a 40,000-object database; and lists of popular targets, such as the planets and Messier objects, can be accessed by pressing a single button. While it's difficult to quantify, I found the hand control to be reasonably tolerant of accidental button presses. I never had the scope lose its sky initialization or unexpectedly begin slewing because I mistakenly pressed the wrong button. You can also instantly stop the scope from slewing by pressing any of the direction buttons without losing the sky initialization.

Unlike Celestron's previous top-of-the-line German equatorial mount, the CGE Pro will track for more than an hour past the meridian before reaching a hard stop. This allows astrophotographers to make uninterrupted exposures as their targets transit their optimum viewing location. You can also begin an exposure with the scope on the east side of the mount and pointed more than an hour before the meridian. But to target an object in this location requires that you manually slew to it, since all Go To commands automatically place the scope on the "appropriate" side of the mount depending on the object's location relative to the meridian.

I tested the CGE Pro with more than a half-dozen telescopes, ranging from a 92-mm refractor (for which the mount was total overkill) up to a 14-inch Celestron Fastar system (that we'll review in an upcoming issue) weighing more than 60 pounds. Along with 66 pounds of counterweights, the Fastar imposed a significant load, yet the CGE Pro handled it as effortlessly as it did smaller instruments.



There are a total of eight clutch handles on the polar and declinations axes, as well as three more for clamping the Losmandy-style dovetail mounting saddle. While the handles provide positive locking, sometimes it can be difficult to get your hand around them because of tight clearances.

A large hand knob and built-in latitude scale make it easy to set the mount's polar-axis elevation. Fine threads on the adjustment screw aid in precise tweaking of the elevation during polar alignment. There's a similar fine-motion adjustment for setting the mount's azimuth position.

Out of the box, the mount's polar drive had a total periodic error of 16 arcseconds, which in addition to being very good, is slightly better than the manufacturer's specification of ± 9 arcseconds. My one attempt at training the mount's periodic-error correction (PEC) reduced this to about half of the original value. Even without PEC training, the tracking error was very smooth and uniform, making the mount a breeze to guide manually. Today, however, virtually all astrophotographers use autoguiding, and to that end the CGE Pro is plug-and-play compatible with any autoguiding system that complies with the de facto SBIG industry standard.

I had no problems autoguiding with an SBIG STV. Furthermore, unlike many mounts that I've set up for autoguiding, the CGE Pro required no finessing of the guiding parameters to achieve optimum results. To the contrary, making large changes to most of the parameters had little effect on the quality of the guiding, which speaks well of the CGE Pro's mechanics. The worm-gear drive on the mount's declination axis is spring loaded, giving it notably backlash-free operation, and this certainly contributed to my autoguiding success.

In part because I used many different telescopes on the CGE Pro (sometimes different scopes on the same night), I liked the fact you can loosen the mount's clutches to aid in balancing equipment without destroying the mount's star alignment. Once new equipment was installed and balanced, and the clutches tightened, you simply cycle the mount's power switch and follow the

startup procedure. This has the mount slew to its "switch position," and then it asks you to verify that the internal clock's time is correct (it remained accurate for weeks), and then it asks what sky alignment you want. By choosing "Last Alignment," you're ready to go without further ado — the whole process taking less than a minute.

The Go To performance of the CGE Pro was as good as that of any high-end mount I've tried. Using the mount portably, I could level the tripod, set the polar-axis elevation with the built-in latitude scale, and "eyeball" the polar axis to the north using Polaris as a guide. I would use the mount's programmed routine for performing a two-star alignment, and then add two or three "calibration" stars.

The process usually took less than 10 minutes, after which the mount would perform Go To slews anyplace in the sky with an accuracy better than ⅒°. This is impressive performance, and I especially appreciated it when I had cameras attached to telescopes. The built-in polar-alignment routine described earlier works best after you've done a two-star alignment *and* added at least two calibration stars — the manual is slightly ambiguous on this point.

During the star alignments, it helps if you either know the names of the sky's brightest stars or have a chart with them marked. You can also take a reasonable gamble that the brightest star in the vicinity of where the scopes automatically points (especially after the initial two alignment stars have been targeted) is the one you want.

After weeks of working with the mount (and way too many nights using it to chase "sucker holes" in the clouds), there were only two things I wished the mount had. The clutch handles, and especially the three handles that clamp the Losmandy-style dovetail bracket for attaching equipment to the mount, can be difficult to grasp because of cramped space. It would be nice if the handles incorporated hex sockets so that a hex wench could be used for those times when it's hard to get your hand completely around the handle.

With wires, and sometimes lots of them, an increasing part of most astro-imaging setups, it would be nice if the CGE Pro had some form of cable-management system. Because the mount's declination axel rotates as a solid unit from the telescope saddle to the end of the counterweight shaft (something that I especially like, since it lets you attach guided cameras to the counterweight shaft), it's impossible to route cables through the declination axis. Cable management was an issue for me because I made so many setup changes during the course of testing the mount, and at times I was a bit careless about letting wires hang freely from the scopes, with predictably unfortunate results.

Overall, the CGE Pro is a great platform for astro-imaging equipment, especially heavy telescopes and cameras. Precise Go To pointing combined with hassle-free autoguiding makes it a real joy to use. It's also a pleasure working with a mount that doesn't shake or move when you're focusing an instrument, or shudder in an expected gust of wind. The CGE Pro is certainly one of the most robust mounts in its class, and I can highly recommend it, especially with its price. ✦

In the Observatory

Including 66 pounds of counterweights, the CGE Pro was carrying almost 130 pounds (59 kg) of weight when outfitted with a Celestron 14-inch Fastar (which will be reviewed in an upcoming issue). The mount handled the load with ease. Because the author made so many equipment changes while testing the CGE Pro, liberal use of strippable painter's tape had to substitute for a more permanent cable-management system.

Senior editor ***Dennis di Cicco*** *occasionally uses his head in unconventional ways when testing astronomical equipment.*

SaT: DENNIS DI CICCO & SEAN WALKER

Autoguiding is a plug-and-play feature of the CGE Pro for any guider that complies with the SBIG standard and modular jack. Out of the box, the mount worked perfectly with the author's SBIG STV autoguider on the first night he tried it. This view of the globular cluster M13 was assembled from 5-minute autoguided sub-exposure with an 8-inch f/8 Astro-Tech Ritchey-Chrétien astrograph, which will also be reviewed in an upcoming issue.