

Two German Equatorials from iOptron

These new GEMs help round out iOptron's full line of Go To telescope mounts.



ALL PHOTOGRAPHS BY THE AUTHOR

The iEQ30

U.S. price: \$1,299

iOptron, 6F Gill St., Woburn, MA 01801, ioptron.com; 866-399-4587

WHAT WE LIKE:

Lightweight, well made, and portable

Accurate Go To pointing and tracking

Intuitive hand control

WHAT WE DIDN'T LIKE:

Limited astronomical data for objects

The SmartEQ

U.S. price: \$399

WHAT WE LIKED:

Extremely light and portable

Self-contained power

Good Go To performance

WHAT WE DIDN'T LIKE:

Limited to relatively compact telescopes

LONG-TIME AMATEUR astronomers certainly know that the equipment side of our hobby is always evolving. Over time, even once-dominant companies such as Unitron and Criterion have faded away to be replaced by new major players. But some of these changes happen surprisingly fast. Take, for example, iOptron. Five years ago most readers had never heard of this company, even though its astronomical roots stretch back to building observatory control systems in China almost two decades ago. Today iOptron has grown to become one of the leading suppliers of popular Go To telescope mounts.

iOptron introduced its novel Cube in late 2007 (we reviewed it in our February 2008 issue, page 34). It was the first Go To altazimuth mount available as a stand-alone product. Advanced versions

of the Cube followed. Then came the heavier-duty Mini-Tower (reviewed in the December 2008 issue, page 48) and its variants. These were followed by the company's first commercial German equatorial mount, the iEQ45 that we reviewed in our July 2011 issue, page 60. Now there are two new German equatorials: the iEQ30, which is essentially a smaller version of the iEQ45; and the lightweight, highly portable SmartEQ. They round out an unusually complete line of Go To mounts from a single manufacturer.

The iEQ30

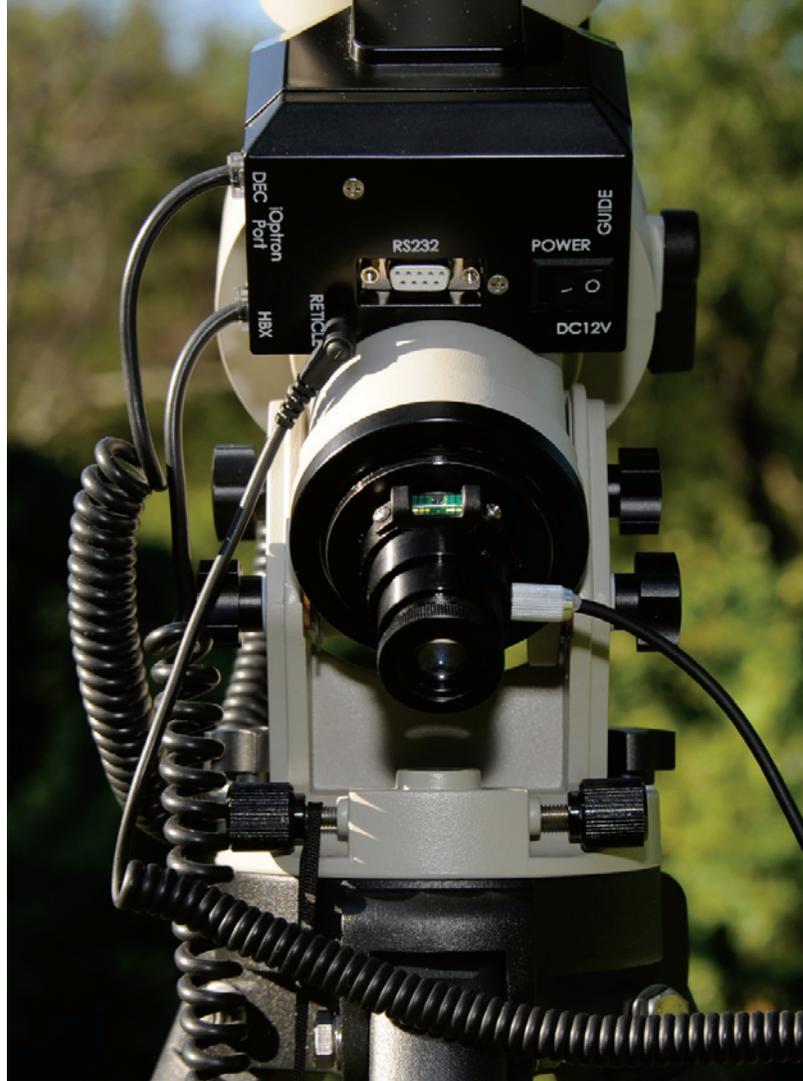
I liked the iEQ30 the moment I laid eyes on it, because it promised to be a modern-day version of my Vixen Great Polaris DX German equatorial. No piece of telescope hardware has served me more faithfully than the Vixen, which has made numerous cameo appearances in our product reviews as I tested telescopes and cameras. With its dual-axis motor drives, the Vixen cost me \$1,600 in 1999, or \$2,200 in today's dollars. The iOptron iEQ30 has a higher load capacity than the Vixen, is lighter in weight, and offers Go To pointing all for hundreds of dollars less. I knew that if the iEQ30's performance lived up to my experiences with iOptron's earlier mounts, it was sure to be a winner. In the end, it exceeded my high expectations.

Each new mount introduced by iOptron seems to build on the success of its predecessors. There are design features on the iEQ30 that I like better than those of the beefier iEQ45, such as the single-lever locking mechanism for the right-ascension and declination clutches.

The mount is very compact, but that also means it's a good idea to keep a set of appropriate hex wrenches handy, since it's difficult to tighten some knobs with just your fingers, especially those for the azimuth locks on the base. The equatorial head is notably rigid given its size and weight. The weakest link in the overall package is the 10½-pound (4¾-kg) tripod. When I was viewing with a hefty 4-inch refractor, vibrations took almost 4 seconds to dampen. A set of commercial anti-vibration pads placed under the tripod legs cut the dampening time by more than 50%, which is very good performance.

The iEQ30 has one of the best polar-alignment systems I have ever used. An alignment scope built into the right-ascension axis has an illuminated reticle that's calibrated for both Polaris (Northern Hemisphere) and Sigma Octantis (Southern Hemisphere). As shown on the next page, the hand control graphically displays where these stars should be positioned on the reticle to achieve polar alignment given your date, time, and location (all of which are determined automatically from the mount's built-in GPS receiver).

Speaking of GPS, perhaps it was just the unit I tested, but unlike iOptron's other GPS models, the iEQ30 often took upwards of 5 minutes to acquire signals from an



You'll want to have a flashlight handy if you set up the mount after dark, because the separate cords for the hand control and declination motor use identical modular jacks on the same side of the electronics box. There's also a modular jack for an autoguider based on the standard ST-4 wiring format, and a 9-pin serial plug for controlling the mount with a computer. The green bubble level is for positioning the reticle in the polar-alignment scope.



A bubble level in the mount's base (not visible here), and a latitude scale marked in degrees, help you set the polar axis altitude.

adequate number of GPS satellites (the other mounts often took less than a minute). The iEQ30's GPS antenna is located on the top of the electronics module where it was easily "shadowed" by my telescopes. Swinging the scopes to the side of the mount to give the antenna a clearer view of the sky seemed to help.

As I've come to expect from iOptron's earlier mounts, the iEQ30's Go To pointing is very good, even when I did only a quick polar alignment and synced the scope on a single star. This always put my Go To target close to the center in the moderate-power field of view. If you do a two- or three-star alignment when syncing your scope, it adds a little time to the setup procedure, but it leads to even better Go To performance. The multi-star alignments also allow the electronics to calculate how far the polar axis is offset from the celestial pole, but it isn't easy to use this information to refine your polar alignment because there are no fine calibration marks on the mount's altitude and azimuth adjustments.

Hand Controller

The Go2Nova 8407 hand controller that comes with the iEQ30 is noteworthy. Since the earliest days of Go To telescopes, I've worked with hand controllers from Astro-Physics, Celestron, Meade, iOptron, and others. Most have been easy to master, but none that I can recall have been as intuitive as iOptron's controllers. Furthermore, unlike those from other manufacturers, I don't need a refresher course when I haven't used an iOptron controller for a while. The basic menus for setting up and using the telescope are all very straightforward. Advanced features that are not needed for basic operation (backlash control and periodic-error correction, for example) may require you to check the manual for details, but anyone having a modest familiarity with telescopes can probably noodle through most of these menus without a manual.

All German equatorial mounts have limitations

when tracking objects across the meridian. The iEQ30 offers three options to deal with that. One is to have the mount stop tracking the moment it reaches the meridian. Another is to continue tracking, but then you need to be mindful that the telescope can track into the tripod or mount. The third option is to have the mount automatically flip both axes and continue tracking your target in the western sky. Although this function worked well, I don't recommend using it because the telescope gives no warning that it's about to start slewing at high speed.

In past reviews, I've grumbled about two aspects of iOptron's hand controllers. The first is the limited amount of descriptive astronomical data displayed for objects called from the internal database. This is particularly the case for iOptron's advanced controllers that have eight 21-character lines of text available in the display. The databases contain 99% of the objects most observers will likely want to see, but there's little information beyond the positions needed for the Go To slewing. This hasn't changed with the latest controller.

My other, larger concern has been the controllers' sluggish keypad entry, which meant that keys had to be pressed slowly in order to enter data. In this regard, the controller for the iEQ30 is much better. It's not perfect, but you can now navigate menus and enter data quickly without losing key strokes. Furthermore, you can set an audible beep that confirms each key press. That's nice for data entry, but there's also a beep when you press the direction buttons while slewing the telescope, reminding me of the old adage about being careful what you wish for.

Overall, I'm impressed with the iEQ30. From experience, I can confidently say that a solid, portable, mid-weight German equatorial mount is a blessing for amateurs like me who do observing and astrophotography with a variety of telescopes at different locations. My Vixen has served me well, but as much as I like it, I'd trade it in a heartbeat for the iEQ30!



A robust screw (*left*) provides precise adjustment of the polar-axis altitude. The hand controller's 8-line display (*right*) also shows the location of Polaris on the polar-alignment reticle when the mount is properly aligned (*below*).





The counterweight shaft on the SmartEQ (far left) retracts into the declination-axis housing for storage. Because the shaft can be locked at any portion of its extension, this feature is useful for fine-tuning the mount's balance. As with all of iOptron's hand controls, the one for the SmartEQ (near left) is extremely intuitive, and many users will probably discover that they can master its basic operation without even having to refer to the mount's Quick Start Guide.

The SmartEQ

The newest member of iOptron's Go To family has benefitted from the company's experience building other Go To mounts. Debuting at NEAF earlier this year, the SmartEQ packs many of the features found in its bigger brethren into a 6¼-pound German equatorial head. The included tripod adds another 5¾ pounds and the counterweight 2 more, but that's all you need for a nice little travel mount suitable for small telescopes and wide-field astrophotography.

Except for its smaller database and lack of GPS, the SmartEQ has all the features described above for the iEQ30, including the graphical position of the pole stars



used for alignment with, in this case, an optional polar-alignment scope. An internal set of eight AA batteries will power the mount for about 20 hours of average use, and there's a provision for running it from an external 12-volt DC power supply.

Tracking and Go To pointing are very good, especially given the relatively small diameter of the mount's plastic drive gears. But, as with all small mounts I've used, there's more to consider than just the SmartEQ's 11-pound load capacity. You also need to consider the physical size of the telescope because a large scope or camera setup will require additional counterweights and the total weight will compromise the mount's performance. I tested the SmartEQ with a 4-inch Maksutov that weighs about 5 pounds (and requires a 4-pound counterweight). It performed well. One of today's compact 5- or 6-inch Schmidt-Cassegrain telescopes is probably about the mount's limit.

Given that virtually all wide-field astrophotography with digital cameras involves exposures of 5 minutes or less, the SmartEQ makes an excellent photography platform. Just eyeballing Polaris through the mount's hollow polar axis shaft gave me good enough polar alignment to make fine 3- and 4-minute exposures from my back deck with a 50-mm lens. This inexpensive unit is a great little mount for constellation and meteor-shower photography or the next bright comet — perhaps Comet PanSTARRS (C/2011 L4), which everyone is hoping will put on a first-class show early next year. ♦

Sky & Telescope senior editor *Dennis di Cicco* remains ever the observational optimist despite having seen his share of "great" comets go bust.