

Sky-Watcher's Dual-Purpose Mount

This mount offers versatility for both astrophotography and observing.



ALL PHOTOS BY THE AUTHOR

Sky-Watcher AZ-EQ5 Mount

U.S. price: \$1,350

Available from skywatcherusa.com and dealers worldwide.

I CAN REMEMBER a time not long ago when aspiring astrophotographers had little to choose from in an entry-level telescope mount. Affordable mounts often had poor tracking and stability, while those that had good capabilities often cost well over \$2,500. Now, those wanting to get into astrophotography without spending a bundle have a wide range of capable mounts to choose from.

One of the latest choices comes from Sky-Watcher in its AZ-EQ5 Mount. As its name implies, this portable mount can be used as either an alt-azimuth, for visual-only use, or as a German equatorial mount suitable for long-exposure imaging.

I tested the AZ-EQ5 in both modes and found it provided excellent tracking and Go To pointing accuracy in a light and portable mount great for impromptu use or serious photography, all for an affordable price.

Load Bearing?

The AZ-EQ5 is a small, lightweight mount. The mount head weighs just 16 pounds (7.3 kg), and 28 pounds complete with its matching half pier and tripod. The mount's modest weight makes for a convenient package to carry outside assembled as a unit. When collapsed to their shortest length, the tripod legs easily fit through doors and other entrances.

The new Sky-Watcher AZ-EQ5 Mount can be used in an alt-azimuth Go To configuration with dual telescopes, as seen here with it tracking under the stars, or as a traditional equatorial mount.

WHAT WE LIKE:

Equatorial and alt-az operation
Accurate Go To and tracking
Encoders allow manual movement

WHAT WE DON'T LIKE:

Optional outboard polar scope
High power draw

However, with the legs retracted the mount is quite short, with the saddle 41 inches (104 cm) above the ground. That may not be high enough for many refractors. Fully extending the legs raises the saddle another 8 inches.

One of the first things a potential buyer of any mount wants to know is “how big a telescope can it handle?” When used as an equatorial mount, the AZ-EQ5’s advertised load capacity is 33 pounds, not including counterweights (two 7.5-pound weights are supplied). I tested it with the 8-inch Quattro Imaging Newtonian tube assembly (reviewed in the March issue) weighing 21 pounds, which required both counterweights. The mount proved to be too shaky for photography with this scope even with the axes locked down tight. However, weight isn’t the only issue at play here; the length of the telescope tube, as well as how far that weight is from the rotational axes of the mount, is an important factor, especially with large Newtonian reflectors. An 8-inch Schmidt-Cassegrain would certainly perform better.

While the mount is sometimes depicted carrying 8-inch or larger reflectors, from my experience I’d suggest that if that’s your intended load, consider Sky-Watcher’s larger EQ6 mount.

But when mated to compact 3- to 4-inch refractors, the combination proved ideal, in either the equatorial mode with a single counterweight, or in the alt-azimuth mode with a pair of small telescopes. In either case, damping time was about one second with the legs fully retracted, making for a rock-steady platform.

Go To Pointing

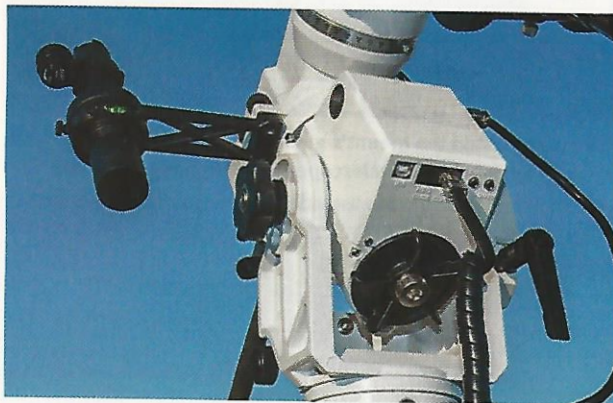
The AZ-EQ5 is a Go To mount employing Sky-Watcher’s SynScan system and its new Version 4 hand-controller. I’ve used the SynScan system on several Sky-Watcher mounts in recent years and have always found it reliable and easy to use. The new hand controller adds multi-language support.

The only glitch I came across was a rare “runaway” where the mount continued to slew as if a button was still pressed. Hitting a slew button again stopped this, and fortunately the glitch did not affect the mount’s knowledge of where it was pointed.

Indeed, a feature unique to the AZ-EQ5 and its bigger sibling, the AZ-EQ6, is what Sky-Watcher calls “Freedom Find.” This employs dual encoders on the mount that keep track of the mount’s position no matter how it is moved. You can unlock the mount and manually push it



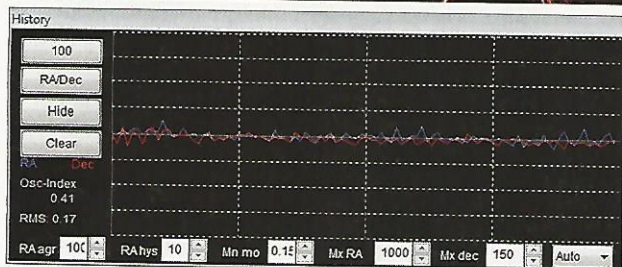
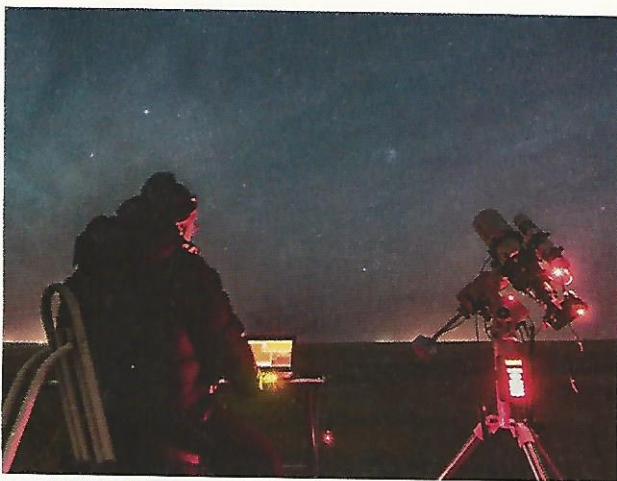
The AZ-EQ5 comes with excellent azimuth and latitude adjustments for precise polar alignment. The latitude adjustment range spans from 0° to 90°. The ribbed black wheel (seen on the counterweight shaft) is the declination lock. Note the secure locking plugs for the declination and power cables, a professional touch.



The large ratcheted handle (right) makes quick work when adjusting the latitude angle. The control panel contains ports for the hand controller, a standard ST-4 autoguider, and a USB jack for computer control. Two “SNAP” ports allow users to connect their DSLR cameras and control their shutters with the SynScan hand paddle. The ribbed black wheel seen here is the RA lock. The saddle accepts Vixen-standard dovetail plates.



An outboard polar alignment scope bolts securely to the mount, replacing a small bubble level used in alt-azimuth mode. The separate “bright field” illuminator is shown on the front of the polar scope.

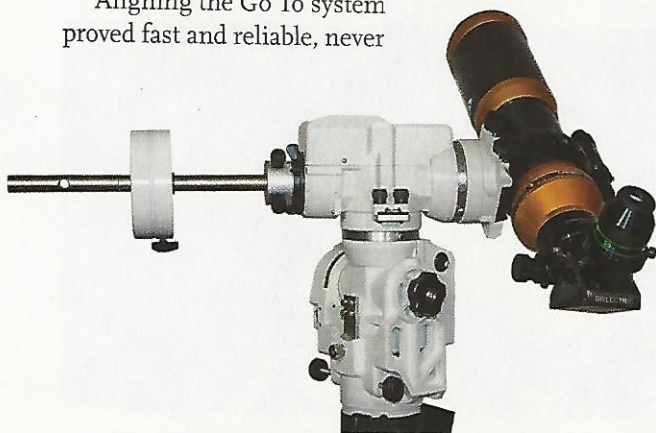


The author tested the mount's guiding using a TMB 92-mm *f*/5.4 refractor as the imaging telescope and a 50-mm guidescope with an Orion StarShoot autoguider. As the guiding graph from *PHD Guiding* shows, the AZ-EQ5 guided very smoothly, with no abrupt runaways or oscillations.

around the sky and it still retains knowledge of where it is pointed. If you are using the mount in a public viewing session and someone accidentally grabs and moves the telescope, even with the axes locked, no problem. Just re-select the object you were aimed at and press Enter, and the mount returns to your target. Very nice!

I found this feature worked great in either equatorial or alt-azimuth mode, faithfully centering targets even after purposely bumping the scope far off target.

Aligning the Go To system proved fast and reliable, never



When set to 90° latitude and locked, the AZ-EQ5 becomes an alt-azimuth Go To mount, for use with one telescope and the supplied counterweights.

yielding a dreaded "Alignment Failed" message. Our test unit, supplied on loan from Pacific Telescopes in Canada, came with the separate SynScan GPS module (optional in most other markets) that automatically feeds the current location and time to the hand controller. This sometimes took a couple of minutes to acquire a fix, but it always succeeded. With it, one still needs to step through menu pages to confirm your time zone and Daylight Time status.

In equatorial mode, from the standard starting position with the mount roughly level, polar aligned, and aimed north, you have a choice of 1-, 2-, or 3-star alignments. For the best accuracy in testing, I used 3-star alignments, in which the mount picks two stars on the west side of the meridian and a third star in the east. The mount slewed to the first star but was usually a few degrees off, typical of most Go To systems. The mount then aimed much closer to the next two alignment stars, often placing them near the center of the eyepiece.

In alt-azimuth mode, you can have it automatically choose the "Brightest Star" in a selected region of sky, an option for those who can't identify any stars. Or you can use a 2-star alignment, in which you select the stars and manually slew to the first star.

Once aligned in either mode, the AZ-EQ5 accurately slewed to every object I chose no matter where it was in the sky, usually placing it dead center or, as was the case with the occasional target, in the central 50% of a low-power eyepiece. This is a Go To system that just works.

Cord wrap wasn't a problem either. For one thing, the only cable that runs from a moving to a fixed part of the mount is the one for the declination motor, and not the all-important power cord. So unlike some Go To mounts, there is no concern about the power cord being yanked out unexpectedly as the mount slews around.

Even so, the hand controller's intelligence nicely prevented the mount from always going in one direction, forcing the mount to backtrack and go the "long way around" when slewing from object to object on either side of the meridian near the pole. This prevented any cord wrap problems.

The "Park" function also worked fine in either mode. This can slew the mount back to a standard home position or simply leave it where it is, where it can be turned off then powered up later to resume Go To operation with no re-alignment needed.

Polar Alignment

While in equatorial mode, the mount requires at least a rough polar alignment for the Go To system to function. But for long-exposure imaging and tracking, polar alignment has to be accurate. However, the design of the AZ-EQ5 precludes any polar alignment scope mounted within the polar axis itself.

Instead, the mount uses an optional polar scope that

attaches to the side of the mount with a solid bracket. When packing the mount head away, the polar scope needs to be removed and stored separately, then re-attached each time. That's an inconvenience, though it's simple enough to assemble using the captive bolts.

Initially I was concerned that the repeated assembly of the polar scope would upset its alignment with the polar axis. This proved to be a non-issue. Despite some play in the bolt holes, it was easy to replace the polar scope consistently each time to achieve accurate polar alignment and excellent photographic tracking.

More of an inconvenience is that its "bright-field" illuminator is a separate battery-powered unit you place over the front of the polar scope. It works fine, but is an item that could easily be forgotten or misplaced.

Tracking Accuracy

By visually inspecting a guide star on a cross-hair eyepiece, I checked for the smoothness of the tracking. The motors employ belt drives, so the mount didn't exhibit the traditional back-and-forth periodic error of a worm gear drive. The guide star stayed nearly motionless within the reticle's 10-arcsecond box for at least 10 minutes. But then, over a couple of minutes, it would


slowly drift off to a new position about 30 arcseconds away where it would sit for many more minutes.

An autoguider would handle this drift with no problem. Indeed, the mount guided beautifully using an Orion StarShoot autoguider and *PHD Guiding* software. However, this performance was with a small 50-mm guidescope and a 92-mm refractor as the imaging optic. Weigh the mount down with too much load, and tracking accuracy will certainly suffer, especially on windy nights. Using my modest load, I was able to consistently get well-guided images with exposures of 5 to 10 minutes.

Alt-Azimuth Mode

Of course, you could use the AZ-EQ5 as an equatorial mount full-time, even if you had no desire to take pictures. However, the advantage of its alt-azimuth mode is that polar alignment is not required to find and track objects. So that's one less step to worry about in setup — handy for grab-and-go observing.

The other advantage of alt-azimuth mode is that the mount can then handle two telescopes, albeit of modest size, aimed at the same object. To this end, the mount comes with a second saddle unit that bolts onto the retractable counterweight shaft.



The AZ-EQ5 reliably guided many 10-minute exposures, including this image of IC 1848, the Soul Nebula, with a TMB92 Signature Series f/5.5 apochromatic refractor. Total exposure was 50 minutes with a modified Canon EOS 5D MkII DSLR camera.

A dual-scope setup can be particularly useful for solar observing, allowing for simultaneous white-light and H α scopes, or at night for comparing wide-field and high-power views, or for star parties and public outreach.

The second saddle comes with fine adjustments to align the second telescope to the main telescope in altitude, but not in azimuth. However, I found the second scope aligned almost perfectly with the main scope the first time I assembled my two-scope test rig, with little need for fine-tuning. The result was a combination that was fun to use and scan around the sky manually, knowing the “Freedom Find” encoders would track the mount’s position and still allow a Go To slew when needed.

The switch from equatorial to alt-azimuth mode is quick and easy. Simply turn the mount’s latitude up to 90°, and then tighten a captive bolt to hold the head securely in position. In this mode, you still need to perform a two-star alignment, first by manually slewing the scope to a known star to begin the process.

Despite the motors now having to turn at varying rates in each axis, the mount followed objects just fine. Even targets such as the Andromeda Galaxy (M31) stayed well centered even over a couple of hours when passing overhead.

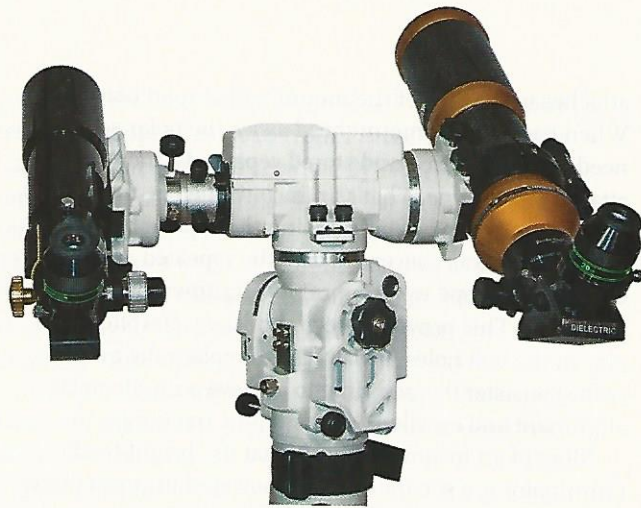
Additional Features

I did much of my testing on autumn and winter nights in temperatures well below freezing. The mount never had any problems in the cold or became hard to move, while the controller’s LCD display remained surprisingly readable. Indeed, the mount slewed very quietly at all times, despite much of the head having plastic covers.

Using the included RS-232 cable I was able to control the mount from my iPad using the *SkySafari Pro* app. Both the wireless SkyFi and wired SkyWire worked fine with “Sky-Watcher SynScan” selected as the telescope of choice in the app.



The secondary saddle has two fine adjustment knobs for aligning the second telescope in altitude to match the field of the main telescope. No adjustment capability is provided for azimuth, though none was needed.



A second supplied dovetail saddle can be bolted to the counterweight shaft to handle an additional smaller telescope. Like the main saddle, the second saddle accepts a Vixen dovetail plate.

The AZ-EQ5 comes with a power cord to plug into a 12-volt car lighter jack or into Sky-Watcher’s optional AC-to-DC power supply. However, powering the mount from one of the popular and compact lithium batteries, with their standard 12-mm barrel connectors, will require an adapter cable to go from your battery’s barrel plug to a female cigarette lighter jack, as the mount head uses a unique, though lockable, power jack, not the 12-mm barrel connector most other telescopes use.

I did find the mount rather power hungry, depleting a large jump-start battery in just a short evening of viewing. The specifications state the mount draws a hefty 3 amps at 11 volts. I would not run this mount off your car battery from a remote site! If the voltage drops below 11 volts the mount’s power light begins to flash a warning, and if the voltage drops too low, the instructions advise that the mount or hand controller could be damaged. Even worse, your car might not start!

The mount has two “SNAP” ports that can control a DSLR camera shutter using the supplied cables suitable for Canon cameras that use Canon’s E3-style mini-phono plug. Cables for other cameras are available from Sky-Watcher or from camera stores. The hand controller can be used to program and store up to eight exposure and interval combinations. This worked well, though the two ports supply the same commands to each camera.

In all, the AZ-EQ5 proved to be an excellent performer for anyone looking for a lightweight, affordable mount. At approximately \$1,350, plus options, it’s slightly more costly than other mounts in its weight class. But the versatility of the dual-mode operation, its accurate tracking, and the convenience of its “Freedom Find” encoders are all very appealing. I’ve added the AZ-EQ5 to my list of recommended entry-level mounts. ♦

Contributing editor Alan Dyer is author of the ebook *How to Photograph & Process Nightscapes and Time-Lapses* available at amazingsky.com/nightscapesbook.html.