

REVIEWED

SKY-WATCHER EQM-35 PRO SYNSCAN MOUNT

▼ The Sky-Watcher EQM-35 PRO SynScan mount, handset and tripod. Image: Sky-Watcher.

Sky-Watcher's new travelling companion

Geoffrey Lenox-Smith tests a new modular mount from Sky-Watcher. Does it succeed in being two mounts in one?

The search for the perfect travel mount for imaging has attracted a lot of interest in recent years. Such a mount should be light, stable, carry a decent payload, track accurately and fit into a suitcase that you can take onto an aeroplane when flying to dark-sky destinations. The Sky-Watcher EQM-35 PRO SynScan is the latest mount to be launched into this market. It is advertised as being two mounts in one: a regular GoTo equatorial mount motorised in both axes, and (with the dec. body removed) a lightweight travel mount motorised in RA only. The claim is that it was designed as an imaging system that also works well for visual astronomy. I tested the mount accordingly, primarily as an imaging system, suitable for both back-garden as well as travel imaging. Upon delivery, I was pleased to see that the mount came with two printed manuals, one specific to the mount, and the other explaining the SynScan v4 handset. Meanwhile, a separate piece of paper advises users to visit skywatcher.com to download the latest version of the hand-control firmware. Powering up the handset, I saw that I had version 4.37, while the Sky-Watcher website had v4.39. My first task was therefore to update the firmware, which I found more difficult than it should have been. The cable provided for this purpose



At a glance

Weight:	mount head 4.4kg, tripod 5.7kg
Accessories:	two 3.4kg counterweights, cables
Handset database:	>42,900 objects
Payload capacity for visual use:	10kg
Tracking:	Dual- or single-axis; lunar, solar or sidereal
Power:	DC 12V (Sky-Watcher 7Ah or 17Ah power tank recommended)
Details:	opticalvision.co.uk
Price:	£629

The Sky-Watcher EQM-35 PRO SynScan is the latest mount to be launched into the travel mount market

connects one end to the handset, while the other end has an old-fashioned RS232 connector to attach to your computer – but very few modern computers have such an old COM port. I found a serial-to-USB adaptor in my box of computer bits and pieces and finally managed to get the handset to talk to my notebook. I then followed the instructions on several YouTube videos to flash (i.e. upgrade/overwrite) the handset firmware to v4.39. It would have been much easier if the cable supplied went from the handset directly into a USB port.

With my handset now ready for action, I assembled everything together in the regular GoTo mode. My first impressions were very positive: the instructions were clear, everything fitted together well and it all seemed very sturdy. The metal accessory tray holds the legs of the tripod apart and also has holes to store five 1.25-inch and a pair of two-inch eyepieces while observing. The maximum payload is claimed to be 10 kilograms. These payload limits are normally stated for visual astronomy – when imaging it is typically safe to use up to about 60 per cent of the visual limit, so I could safely load up to six kilograms of imaging gear onto the mount. This ties in with Sky-Watcher's advice to use this mount with refractors with apertures of up to 100mm diameter, or Maksutovs up to 127mm. The mount accepts Vixen-style dovetail bars in its dec. head, the industry standard for telescopes up to mid-range, so no problem there. I was planning to try the mount with an Equinox 80 refractor, a field flattener, a filter-wheel and an Atik 460EX mono camera, all together weighing around four kilograms, so I was well within the maximum imaging payload limit.

The mount in regular GoTo mode

When setting up the mount in your back garden, a useful bubble indicator on the mount head helps you ensure that the tripod is level. Polar alignment is easy thanks to the polar-scope provided and the SynScan handset, which gives the correct position for Polaris in the polar-scope for your date, time and location. For users in the Southern Hemisphere, the polar-scope reticle is marked with four circles; when four stars of the constellation Octans are placed in these circles, the mount is polar-aligned to the south celestial pole. The polar-scope should ensure alignment accurate for most purposes, but the SynScan handset also includes a software option to improve polar alignment through a step-by-step process. I found that my auto-guiding took care of any residual polar-alignment error after using the polar-scope, so I had no need for the SynScan alignment-improvement process. I placed my Equinox 80 with a 25mm eyepiece onto the mount and ensured that everything was in balance. With



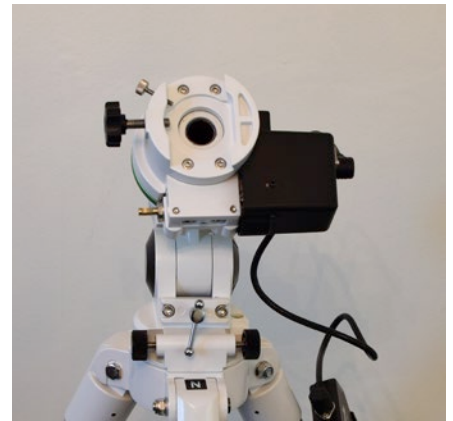
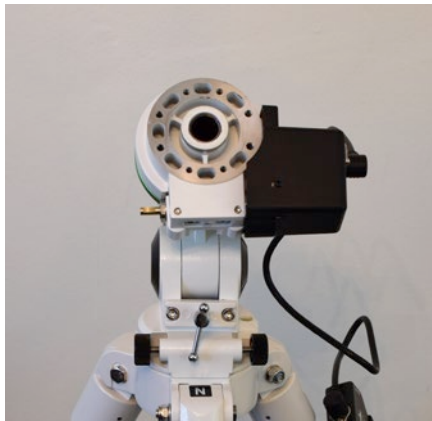
the clutches disengaged, both axes were a bit stiff, but while it was hard to choose a point of perfect balance, it was possible to get close enough.

Now I could confirm that the mount was in the home position (with the counterweight shaft at its lowest and telescope pointing north), I switched on the power. The SynScan handset needs certain information to be entered for its initialisation process: latitude and longitude, time zone, date, time, etc. The last step of the process asks the user

▲ The Eastern Veil Nebula, imaged by the author using the EQM-35 in GoTo mode. Image: Geoffrey Lenox-Smith.



▼ A closer look at the EQM-35's travel mode. Image: Sky-Watcher.



▲ Removing the dec. head from the EQM-35 for travel mode, which highlights the modular aspect of the mount. First, take off the dec. body by unscrewing the four M6 bolts (arrowed) using an Allen key. This exposes the mount head, onto which the saddle head can then be installed using the four M5 bolts provided. Images: Geoffrey Lenox-Smith.

whether or not to begin the alignment process. If you want to observe or image a bright object such as the Moon or Jupiter, there is no need to align the mount – you can easily slew to the target and start the fun. If the target is dimmer, then it is best to align the mount first and then ask it to slew accurately to the target. I was hoping to image part of the Veil Nebula, a dim object, so I chose to begin the alignment process.

For an equatorial mount, SynScan offers a choice between one-, two- or three-star alignment. When imaging a dim object, I would normally opt for one-star alignment, choosing a star close to my ultimate target. For testing, however, I chose three-star alignment. The SynScan manual advises that the three alignment stars should be spread out over the sky. I therefore aligned the telescope with Arcturus, Dubhe and Vega from the list of stars offered. I was soon greeted with an 'Alignment Successful' message and spent a few minutes happily sending the mount to various targets in all directions. All the targets were visible near the centre of my 25mm eyepiece, so the SynScan system passed this test with flying colours. When slewing, the motors are certainly not silent, but they're quiet enough not to wake your neighbours. When tracking, the RA motor makes a gentle regular sound like a cat purring.

It was now time to begin my imaging of the Eastern Veil Nebula, so I instructed the mount to slew to NGC 6992 and replaced the diagonal and eyepiece in the telescope with a field flattener, filter-wheel and CCD camera. Starting up my imaging program on my notebook, I checked the focus through a hydrogen-alpha filter and was pleased to see the Eastern Veil nicely framed in the picture. The GoTo had worked a treat!

I then set up the guiding (in both RA and dec.) and captured 10 six-minute exposures each in hydrogen-alpha and O-III at -10 degrees Celsius. The next morning I processed the results, assigning hydrogen-alpha to the red channel and O-III to both the green and blue channels. I was pleased with the result as it proved that the mount had tracked and guided accurately over the two hours of exposures. In its regular GoTo mode the mount had been a pleasure to use and had delivered an attractive image with no subs having to be thrown away.

The mount in travel mode

The EQM-35 can be used in its travel mode in two different configurations, which illustrate the mount's modular design. The 'light' mode requires removal of the dec. body, installation of a saddle head (supplied with the EQM-35) in its place, and the installation of a Star Adventurer L-shaped bracket, a counterweight shaft and a counterweight (not supplied with the EQM-35). If you already own the Star Adventurer Astro bundle, then you already have the bracket, shaft and counterweight ready for this new role. If not, they can be purchased separately. The 'super light' travel mode requires removal of the dec. body, installation of the saddle head and the addition of a Star Adventurer ball head adaptor (not supplied with the EQM-35). The adaptor is a short dovetail plate offering a standard 3/8-inch screw, to which you can attach your own ball head with, say, a DSLR camera on top.



◀ The EQM-35 mount in its 'light' travel mode, with the dec. bar removed and using components from the Star Adventurer Astro bundle. Image: Geoffrey Lenox-Smith.

▶ The EQM-35 in 'super-light' travel mode can be used with a ball head (bought separately) and a DSLR camera. Image: Geoffrey Lenox-Smith.

The EQM-35 can be used in its travel mode in two different configurations

In either of these travel configurations the EQM-35's dec. axis has been removed, saving weight as you no longer have to carry the dec. body, shaft and 3.4 kilogram counterweight. Since the dec. motor has been removed, however, guiding is now possible in RA only. But this should not be a major problem if your polar alignment is accurate, focal length is short and exposure times are not too long. The EQM-35 in travel mode can be thought of as a beefed-up Star Adventurer (Sky-Watcher's smaller travel mount, to which a DSLR or small telescope can be attached), with a maximum payload of ten kilograms compared to the Star Adventurer's five kilograms. The EQM-35 is much more stable and I was hoping to have to reject very few subs as a result of tracking errors compared to when I use my Star Adventurer. Since I already owned the Star Adventurer components, I decided to try out the 'light' travel mode.

Polar alignment is easy thanks to the polar scope provided and the SynScan handset

My simulated travel excursion involved packing the astro-equipment for a trip... to my back garden. I happily packed the reduced mount head, now weighing a modest 3.3 kilograms. The tripod was less of a success; supplied with the EQM-35, it weighs 5.7 kilograms and folds to a minimum length of 96 centimetres – your suitcase would have to be huge to fit it in, and even then it would use up much of your total weight allowance. The tripod is very sturdy, with legs of 4.5-centimetre (1.75-inch) diameter steel, and perfectly suitable for travel by car, but unsuitable for travel by air. If using this mount in travel mode, I suggest buying a smaller and lighter astro-tripod weighing around two kilograms.

Setting up my 'light' travel mode outside, I once again levelled the tripod and polar-aligned the mount. Since I wanted a modest focal length I decided to attach my Atik 460EX monochrome camera to a Nikon 180mm camera lens – I could now image the whole of the Veil Nebula. With the motorised dec. axis removed, it was no longer possible to use the SynScan GoTo process to locate a target. Instead I used a red dot finder to point the Nikon lens to the approximate region of sky where the Veil is located.



▲ The tripod that comes with the EQM-35 mount is solid and sturdy, but too large and too heavy for taking on an aeroplane. Image: Sky-Watcher.

▲ The cable for flashing (i.e. upgrading/overwriting) the SynScan firmware has an RS 232 connector, which is not found on many modern computers. Image: Geoffrey Lenox-Smith.

■ The EQM-35's SynScan handset, following the upgrading of its firmware to version 4.39. Image: Geoffrey Lenox-Smith.

Once I had reached good focus through a hydrogen-alpha filter, I could see the whole nebula on my notebook. I set up guiding in RA only and took 8 eight-minute exposures each in hydrogen-alpha and O-III at -10 degrees Celsius through the lens. The next morning I combined my results into an attractive image of the Veil Nebula. The reduced mount head had coped admirably with taking the eight-minute subs, even with guiding in RA only.

Conclusions

The EQM-35 mount worked flawlessly throughout the review period. It was disappointing that the cable supplied to upgrade the handset firmware used the old-fashioned RS232 connector, but I managed to carry out the flashing (i.e. upgrading/overwriting) using my own serial-to-USB adaptor.

In its regular two-axis GoTo mode, the mount worked perfectly with the four-kilogram payload that I was using. Polar alignment was easy with the

supplied polar-scope. Tracking and guiding went well. I would be happy taking a series of one-minute or two-minute exposures unguided with a modern CMOS camera, or guided exposures of five minutes or longer with a CCD camera.

The EQM-35 package is not so successful in its travel modes. The supplied tripod is much too heavy and too big for a travel system – it is possible to buy lighter, smaller, astro-tripods that are still sturdy enough for the job. However, the reduced mount head works well in its 'light' travel mode, accurately tracking and guiding in RA only, but additional equipment must be purchased if you do not already own a Star Adventurer Astro bundle.

I recommend this mount highly when used with its target payload, both as a regular GoTo computerised mount for use at home and (with an alternative lighter tripod) as a travel mount for imaging abroad.

Geoffrey Lenox-Smith is an amateur astronomer and astrophotographer from London.

▼ The entirety of the Veil Nebula, imaged using the EQM-35 in its 'light' travel mode, without the declination head. Image: Geoffrey Lenox-Smith.

