Nienna Latitude Screw Manual

Manual Version N-LS-MX-2024-04-04.1EN

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1. Introduction

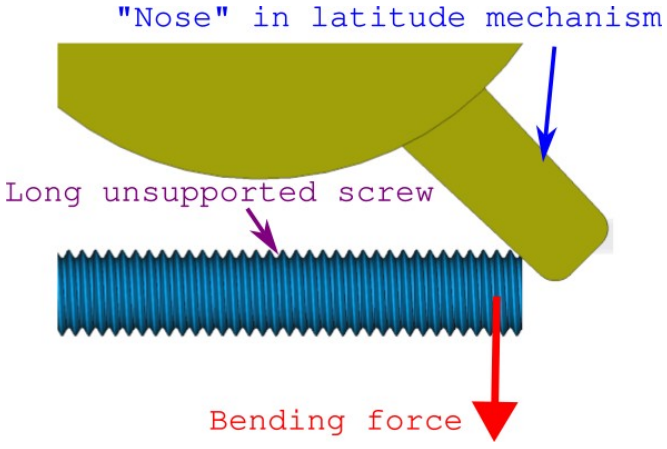
Most equatorial mounts for telescopes come equipped with a pair of bolts for latitude adjustment. While those screws work just fine in most cases, there are situations were you might want to exchange your screws, particularly the longer of the two screws:

- The original screw might be a bit uncomfortable to use. It might have sharp corners, or be very cold to the touch, or simply feel a bit cheap.

- The grip might be too small for fine adjustment of latitude.

- Conversely, the grip might be too large. In Celestron's Advanced VX mount in particular the screw is so long that it will block access to a polar scope at moderate to high latitudes.

- Particularly problematic: At latitudes above about 45–50 degrees, the polar alignment screw is strained in these polar alignment mechanisms. In these mounts the latitude screw pushes onto a nose within the latitude mechanism. This happens at more of an oblique angle for higher latitudes, causing a significant bending force. More than a few latitude screws have been bent out of shape because of this, sometimes entirely getting stuck in the mount, requiring expensive repair. This problem is exacerbated by the low quality steel often used in adjustment screws.



Niennas latitude screws address all of these problems.

(We are aware that you are currently reading a full-blown manual for a screw. But there are quite a few details to mention, especially about how to select the right size and how to operate it once you have it.)

2. Description

Each screw consists of the screw itself, a large handle, and a spring mechanism to engage or disengage the handle for free rotation.

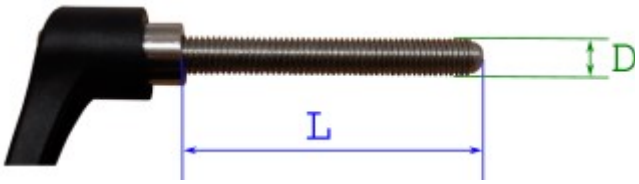
The screw and the spring mechanism are made of high quality stainless steel of much higher strength than the mild steel screws commonly used in many mounts.

For the handle we chose fibre-glass reinforced plastic. The reason for this choice is improved handling comfort at low temperatures. We can make similar screws with zinc alloy handles or stainless steel handles on request, but we do not recommend this solution.

The handle is pulled into a toothed ring which locks it in place. By pulling out the handle (or by pushing the tap in the middle with your thumb) the toothed ring is disengaged and allows you to rotate the handle freely without turning the screw itself.

3. Proper sizing

Two main dimensions of the screw are relevant in order to select a suitable replacement screw: its thread diameter (D) and its thread length (L). Both of these need to be correct in order to properly fit your mount.



The thread length is reasonably easy to measure with acceptable precision. All you need is a simple ruler. The thread diameter is much more tricky however. If you are unsure of the thread diameter have a look at the end of this manual for a handy trick on how to measure it if you do not own a caliper.

3a. Thread diameter

Most equatorial mounts use metric threads for their latitude screws. The most common sizes are M8, M10, and M12, with the corresponding diameters (D) of 8mm, 10mm, and 12mm respectively.

There are a few mounts out there which use screws in Freedom Units rather than Metric, but those are increasingly rare and Nienna does not currently offer replacement screws in these sizes.

The following is a list of known threads for the most common mounts. You will find that some mounts are listed with more than one thread. This happens when a mount has had a design change through its generations in which the thread was changed. Please be sure to check your particular mount before ordering! See the trick at the end of the manual!

Sky-Watcher

- EQ1: M8
- EQ2: M8
- EQ3: M8 (older mounts) or M10 (newer mounts). This is true for both the manual mount and the Synscan Pro GoTo mount.
- EQ5: M8 (older mounts) or M10 (newer mounts). This is true for both the manual mount and the Synscan Pro GoTo mount.
- HEQ5: M10
- EQ6: M10
- EQ6-R: M10 and M12 (shorter screw is M10, longer screw is M12)

Celestron

- Astromaster: M8. This is true for both sizes of the mount.
- Omni (CG4): M8
- Advanced GT: M8
- Advanced VX: M12

Meade

- Polaris EQ: M8. This is true for both sizes of the mount.
- LXD75: M8

3b. Thread length

At lower latitudes the exact thread length does not matter. The worst that can happen is that the screw might stick out a bit further.

At higher latitudes however the length becomes important in two ways:

- If the screw is too short then it might not reach the "nose" in the latitude mechanism.

- If it is too long it will stick out too much and either block access to the polar scope, or even block the mount from being adjusted to higher latitude angles.

Therefore it is best practice to select the shortest screw that you can get away with whilst still reaching the "nose" in the latitude mechanism at your latitude, with a small amount of wiggle room.

You can try this out with your existing screw. Set your latitude on the mount, then measure how much of the threaded length of the screw is still visible. Remove the screw and measure its total threaded length, i.e. the length of the screw minus the length of its head and handle. Finally, subtract the length of the thread sticking out that you measured just a moment ago.

Example:

1. Let us say your latitude screw sticks out 12mm once you have set the mount to your correct latitude. You can directly measure this with a ruler.

2. Once you have removed the screw from the mount you measure its threaded length to be 94mm.

3. If we subtract 12mm from 94mm we get an ideal length of 82mm. Let's add a couple of millimetres just to be on the safe side and call it 84mm instead.

4. The ideal replacement screw in this case should therefore be as close as possible to, but not shorter than 84mm. Note: as mentioned above the screw will not usually get in the way at lower latitudes. If you have easy access to the polar scope and there is enough space between the mount and the screw to allow it to be adjusted, there is no need to select a shorter screw than the original.

4. Scope of delivery

Each screw comes pre-assembled. A kit consists of exactly one screw. This is because typically only the longer of the two screws on most mounts might need replacement.

No tools are needed for operation. Unscrewing the Torx screw at the centre of the handle allows for the handle to be removed. This is however not needed for normal operation. If you do remove the Torx screw, e.g. in order to clean the mechanism, be careful not to lose the spring that sits underneath it.

5. Installing the new screw

When removing your old screw and attaching the new one we recommend to do so without the tripod, telescope, or counterweights attached. This will reduce any forces acting on the screw and will provide better access to rotate the screw without getting blocked by the polar scope or tripod.

At higher latitudes you will reach a point where the polar scope and/or tripod block further rotation of the screw. From this point onwards you can disengage the handle by pulling on it, then rotate the handle half a turn counter-clockwise, and then let the handle snap back into its locked position. Turn the screw another half turn in a clockwise direction. Repeat this process until you have reached the correct latitude setting on the mount.

Pull Rotate Release

6. Latitude adjustment with the new screw

You can perform your latitude adjustment as you normally would. The larger handle should provide better precision, and the risk of bending the screw is much reduced. Here are a few hints and guidelines. Note that most of these are relevant regardless of whether you use the Nienna screw or the original screw.

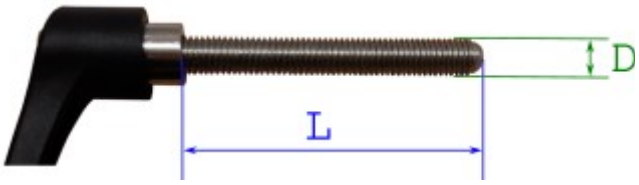
- Always loosen the opposing screw first before you tighten the latitude screw.
- Do not overtighten the screw! If you feel resistance pause and check if the opposing screw is loose.
- Try to do the polar alignment with the least amount of load on the mount. If possible perform the alignment before you attach the counterweights and the telescope.
- Do not do any large adjustments only with the screw itself. Instead, loosen the screws, then push the mount up or down by hand until it is roughly in the right position, and only then use the screws for final adjustment.
- When the handle hits the mount or the tripod, rotate the handle into a better position. (See image above.)
- Once you are happy with the adjustment, park the handle pointing downwards to avoid catching on the handle later on. (See image to the right.)

7. Notes

1. We have selected this particular shape and size of the handle to achieve a good compromise between smooth function, robustness, and sufficiently compact size. We are aware that there are instances where a smaller handle might be advisable – for example on the EQ3 mount at very high latitudes. Thus there are cases where we would advise against the use of our screws for this reason.

2. As mentioned earlier we have intentionally selected fibre-glass reinforced plastic for the handle. At cold temperatures handling a metal grip can be quite unpleasant. We do offer custom made latitude screws with die-cast zinc alloy or even stainless steel handles if you prefer this for aesthetic reasons, and if you deal with touching a metal grip in the cold. Zinc alloy is available at the same price as the default variant. Stainless steel handles come at roughly 75% higher cost.

Appendix: How to measure the thread size of your existing screw

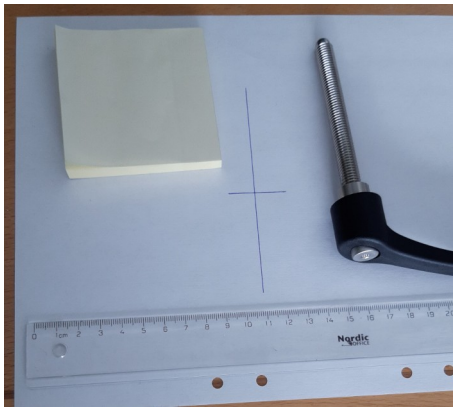


First, have a look at this image to see what we mean when talking about thread diameter and thread length. For the diameter you need to measure the outside diameter of the threaded part of the screw, (D) in this image. Do not measure the inside diameter of the thread in your mount as that will give the wrong results.

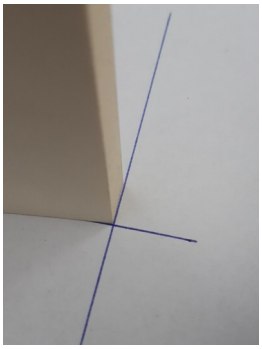
For the length we count the entire threaded bit including the tip. Marked with (L) in the image.

Measuring the length is reasonably straight forward. You can use a simple ruler to get a measurement with acceptable precision. Of course you can get better results with a caliper.

As for the diameter it unfortunately becomes more tricky. There is no place on the screw where you could take a decent measurement with a ruler. You can either use a caliper if you have one, or else you can use this handy little trick to get a good enough measurement. What you need is the following:



- Your original latitude screw
- A piece of paper and a pen
- A ruler
- Some item that has at least one reasonably square corner. In this example we chose a pad of post-it notes.

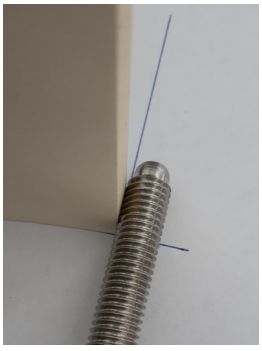


1. Draw a straight line on the piece of paper with the help of your ruler. Draw a second shorter line crossing the first line at as close as possible to a right angle.

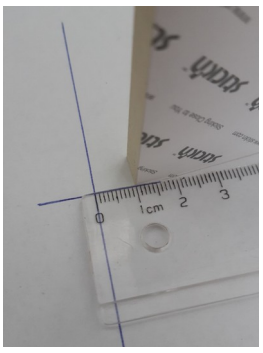
2. Place your item with the square corner on the piece of paper as shown on the image to the right. Note that one corner is placed where the two lines cross and the side runs parallel to the long line.

3. Hold the square item in place and put the screw next to it. Try to get the screw somewhat parallel to the long line. See the first image below.

4. Now hold the screw in place and place the square item on the opposite side of the screw. Hold the square item and remove the screw. See the second image below.



5. You can now measure the distance between the long line and the square object with the help of your ruler. See image to the right.



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