

Assuring Compass Accuracy in the Solmetric SunEye

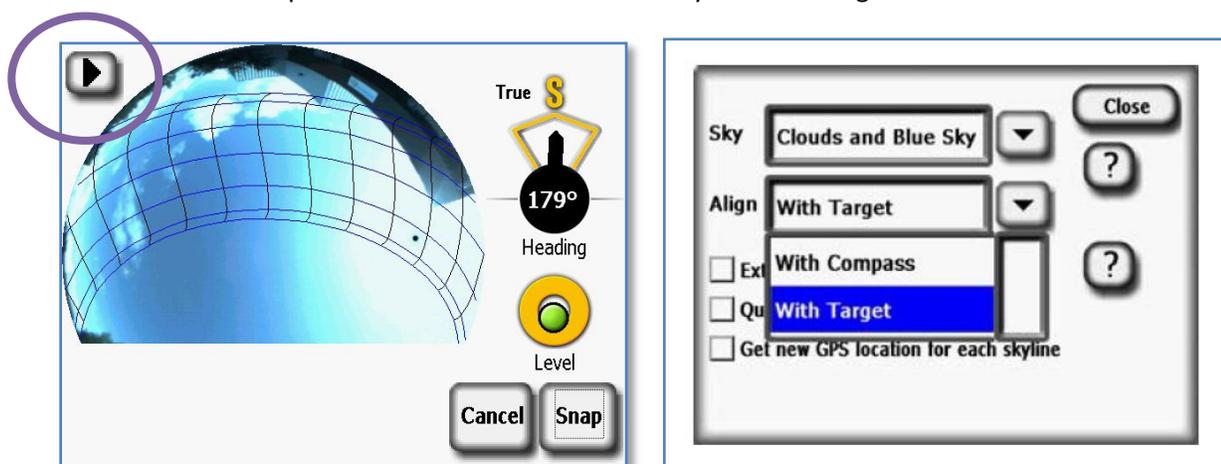
Application note August 15, 2014

There are two kinds of compass errors that can occur in the SunEye-210. The first is caused by ferrous metals near the SunEye during measurements and the second is caused by the SunEye becoming magnetized.

Ferrous metal distorts magnetic field lines

If you imagine a traditional needle compass, the needle points north-south along the earth's magnetic field lines. Ferrous metal, such as an iron vent pipe, metal roofing, car, or even nails in shingle roofing distort the earth's magnetic field lines in the proximity of the metal. The compass needle will always align with the field lines, so if the lines are distorted then the needle will no longer point north-south. The SunEye electronic compass behaves the same way as a needle compass. If the SunEye cannot rely on the magnetic field lines for orientation relative to the earth, then the Skyline reading and subsequent solar access values will not be correct.

The SunEye has a feature to get around this problem called "align with target" mode. In this mode, a compass heading is taken on a distant reference point such as a mountain peak or distant building when the SunEye is far enough from the ferrous metal to not be impacted. The distorted field lines can usually be avoided if you stay 4-5 feet from the metal depending on how much metal is present. The heading of this reference is recorded in the SunEye. Then the shade measurement is made in the desired location close to the ferrous metal, but the SunEye is pointed towards the reference object (ignoring the compass) when the skyline is captured. Then the SunEye uses the recorded heading of the reference object as the heading of the skyline, and the results are then correct. Target mode is enabled via the menu button in the preview screen shown in the SunEye screen images below.

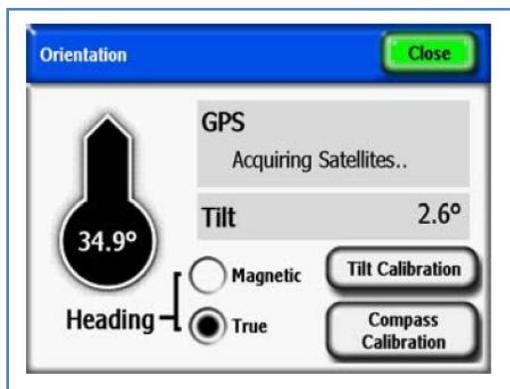


Magnetization of SunEye

If the SunEye is exposed to a strong magnet such as on a magnetic “torpedo” level or in the motor of a cordless drill, then a (semi-)permanent error in the compass readings can be induced. In other words, if you expose it to a magnet, then remove the magnet, the SunEye compass will no longer be calibrated and will no longer give proper compass readings, and any Skyline readings or subsequent solar access values will have errors. The SunEye has a feature that enables users to check and correct this kind of calibration error. To check the compass, you need a day when the sun is out and visible in the SunEye camera image (usually as a black dot). The SunEye will use the date, time, latitude, and longitude to predict where the sun should be in the camera image at that moment and then compare this to where it actually is in the image.



Access the “verify cal” feature via the orientation button on the SunEye: . Then click the “Compass Calibration” button followed by the “Verify Cal...” button. Follow the instructions. It is important to be away from any ferrous metal when performing this verification.



It is recommended that a compass verification be performed at least once per month or any time the SunEye is suspected to have been exposed to a strong magnet.

At the end of the verification, if the compass is determined to be out of calibration, then follow the steps to re-calibrate it. In the case where the SunEye was exposed to a strong magnet, wait 24 hours before re-calibrating or perform the calibration, then repeat it 24 hours later.

If a skyline is captured and then it is discovered that the compass had an error, the best thing is to re-capture the Skyline. Alternatively, it is possible to correct the heading associated with the Skyline. To do this, the actual correct heading of the SunEye at the time the Skyline image was captured must be known. Go to the “Skyline” menu, then “Skyline Properties”, then “General”, then click the “H:” next to “Camera Orientation” and follow the instructions.