How to aim the Tracker

Aiming Tracker for the best sun energy capture

For optimum power production, you'll want the centerline of the Control Box's support bracket to line up with TRUE South (or TRUE North if you are in the Southern Hemisphere). You can use a compass to get the MAGNETIC South or North and correct for “magnetic declination” by going online and finding your location's offset.

In the USA, use your zip code at the NOAA website. At least make sure the face of your solar panel will look South or North. Even if you don't go to the trouble of using a compass and “magnetic declination” correction, and you're off a bit, it won't matter too much.

You will need to angle the panel skyward at what is known as “Tilt Angle.” This will let the panel get the best results as the sun makes its journey across the sky. You have to know your installation's latitude location for this one. You can get it from an atlas, or by going online to find it. In the USA, try this NOAA site. Look for the “Solar elevation” value. Plug in the dates of June 21, September 21 and December 21. Those elevation angles are your ideal “Tilt Angles” for Summer, Spring/Fall, and Winter, respectively.

It's not a big deal if you are in a rural area and can't find your exact latitude. Just use the nearest city because a degree of latitude is almost 70 miles from the next.

Once you have your location's latitude, you tilt the panel up by that angle.

For example: Say you are in New York city. You will want a tilt angle of about 40° to the horizontal. Lay a yardstick or some other long, straight piece of something that you know the length of on level ground, and bring the North end (or South end if you're in the Southern Hemisphere) of it up until it is:

36” X sin 40° = 23”

Where 36” is the length of the yardstick, “sin” is the trigonometric function sine, and 40° is your latitude. Thus, the end of that straight something (yardstick in this case) is 23” up, and the other end is touching the ground. This is the angle you want to install the support structure.

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The formula is to take the length of your straight something, multiply by the sine of your latitude, and raise the end of the straight something to the resulting height. That is your “Optimum Tilt Angle.” The sine function is available in all operating system calculators. In Windows, you have to tell the calculator to go into “Scientific” or “Engineering” mode to use the sine function.

Wherever you install the Tracker, you should mount it at the tilt angle. So you'll want to attach the feet of the Control Box to a support that you then attach to a wall, a post, a roof, etc. Angle the support to the Tilt Angle calculated previously and secure it in place.

You can easily build your own Tracker mount. See the document “Build a Simple Mount for the Tracker” on the Support page.

Optimizing the Tilt Angle for different seasons

If you watch the sun's arc across the sky in winter, and compare that arc to the one the sun travels in summer, the winter arc is at a much lower angle from the horizontal. Illustration 1 shows this differential.

In order to make your panel produce optimal results in summer and winter, you'll want to change the Tilt Angle depending on the season.

Tilt Angle should be steeper in the winter than in the summer because the arc of the sun in winter is lower.

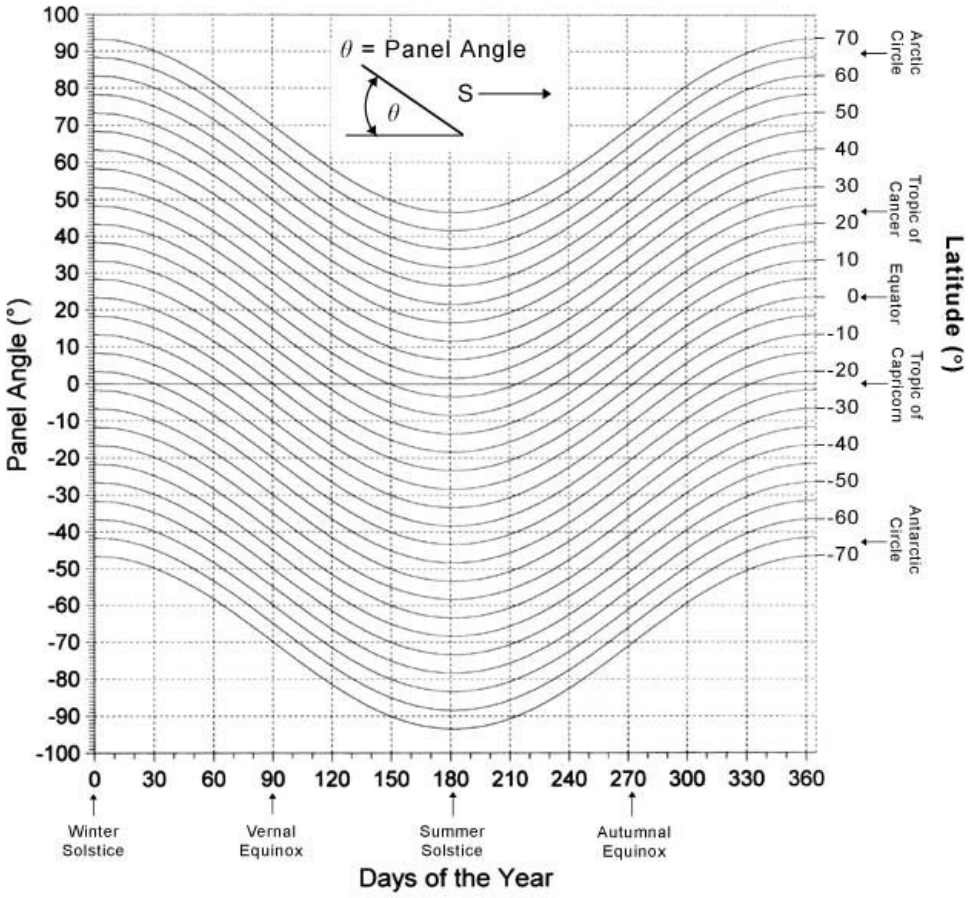

Illustration 1: Seasonal Tilt Angle

06/24/09

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For example, you are in New York and want to optimize your Tilt Angle for the middle of summer. You know you are at 40° latitude, so look on the right vertical axis of Illustration 1. Follow that 40° line as it curves down to the left. On the bottom axis is “Summer Solstice”, and on that date the curved line is a little less than 20° according to the “Panel Angle” on the vertical left axis. So you will want the Tilt Angle to be 20° for the best sun capture during the summer. In Winter, using the same technique, the angle would be about 62°.

If you build your own support structure, you may want to make it adjustable so you can vary the Tilt Angle.