

## Some notes about cloud detection and the CloudWatcher



Cloud detection is, unfortunately, not straightforward. Nobody has yet found a fail-proof way to determine the degree of cloudiness of the sky, other of course than the human eye, and then not always!

The CloudWatcher, as most devices, uses IR measurement as the basic tool to determine if the sky is clear or not.

A clear sky has a lower IR reading than a cloudy one.

Other conditions, however, also affect the measurement, such as the ambient temperature, the humidity, the density and size of particles in the atmosphere... there is no good formula to quantify these contributions.

The traditional approach has been to subtract the ambient temperature from the infrared reading, and use that to decide cloudiness. The CloudWatcher improves this approach by adding some factors to further correct for local conditions (the “K” factors); the contribution of local temperature is not the same in a very cold climate, than in a coastal warm one, for example.

In our experience, there are two valid approaches to have very reliable cloud detection, depending on the conditions: frequent calibration, and good calibration.

- **Frequent calibration:** if you have access to see the sky often, in person or via a good AllSky camera, you can then tweak the limits (clear – cloudy – overcast boundaries). A very clear sky will be for sure at least 10° colder than a slightly cloudy one, usually even more.

It's ideal to see the sky in the clear – cloudy transition, light clouds, and use that as the limit.

Example: IR is reading 0° and the sky is “just cloudy”. We could use -2° for the clear (so colder than -2° will be deemed clear) and 5° as the overcast limit (hotter than 5° will be marked as overcast).

(the difference between cloudy and overcast is recommended to be in the 5 to 10° range)

- **Good calibration:** this involves finding the best K-factors for the local conditions. We'll need to observe the cloud conditions graph for sunup to sunset for a good clear day.

This procedure is more involved, and is explained in detail the relevant section of the [online manual](#).

**In both cases, and specially in seasonal weather changes, one should expect the limits clear / cloudy / overcast to need attention.**

In many climates – other than quite extreme ones – the default K-factors, and some adjustment to the limits a few times every year, is quite enough.

#### **Some other notes:**

- it is important to install the unit as far from IR sources as possible. Over a roof, while convenient, is not the best idea.
- atmospheric phenomena (desert dust, high humidity, thin particles in the air...) do affect rising the IR readings.
- high, thin clouds can be very cold and extremely difficult to detection
- it is worth reading also [this information](#) to understand the rationale behind the CloudWatcher K-factors.
- even with the best cloud detection, sometimes rain falls from a clear sky – specially in certain places – so the rain sensor is an absolute necessity.

The CloudWatcher is a reliable device that helps protect valuable equipment. If neglected, the result is wasted clear, dark nights or even worse equipment damage. Check the suitability of the settings from time to time.

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