



Technical Note: 10000034

Sensor Alignment

It has come to our attention that some users are not aware of the importance of the maintaining the correct sensor head angle when installing a quartz sensor head.

It is very important that the sensor be installed so that the face of the crystal is at 90 degrees (normal) to a line from the crystal to the source.

Allowing the sensor head to be tilted at some angle other than normal to the direction of the vapor stream results in two effects that can impact crystal life and increase the probability of mode hopping.

The first effect is that the deposit on the crystal is not even across the surface. Since the edge of the crystal that angled away from the source is further away from the source and receives somewhat less material, the thickness of the deposit is wedge shaped to some degree. This wedge shape in the deposited film tends to reduce the activity of the crystal at its primary resonance.

The second effect is that the area of the deposit shifts from the center of the crystal. This is due to the shadowing effect of the aperture, which is located some distance from the surface of the crystal. Any lopsidedness in the crystal enhances the strength of spurious (non thickness shear) modes of vibration. If the activity of these spurious modes of oscillation gets strong enough they cause short-term perturbation of the fundamental frequency and if they get very strong, the oscillator can lock onto the spurious mode of oscillation, causing a mode hop.

The combination of both of these effects will have a negative effect on the ultimate crystal life and will increase the probability of mode hops.

To minimize the possibility of these potential problems, it is very important to insure that the surface of the crystal is directed as closely as possible toward the material source.

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