QUARTZ PRO X-ACT – NEW OPTIONS

Temperature effects

The Quartz Pro x-act OCXO is now available with optional temperature stability **down to +/-15 ppb over –20 to 70C.**

A major influence on the crystal frequency is that of operating over variations in temperature. The amount of frequency variation is due to the crystal temperature coefficient, and therefor depends on the crystal cut. It is not possible to completely avoid these frequency variations, if the crystal is going to be used over a wide temperature range. Generally, the smaller the oscillator, the more difficult it is to obtain good temperature stability. Quartz Pro achieves a combination of small size and good temperature stability in the x-act OCXO by using a special thermal insulation design and hybrid technology. In addition, other techniques are used by Quartz Pro to reduce the temperature effect.

The improved temperature stability is accomplished by a *sophisticated temperature compensation* mechanism in the oscillator electronics.

Extended operating temperature

An extended operating temperature up 85C is requested in many applications and is now available as an option in the Quartz Pro x-act OCXO.

An operating temperature of +85C requires the oven to be run at +95C, which means that a crystal design with turning point at +95C is needed. It also means that the electronic components are run at +95C. In this case, Quartz Pro is able to give a separate statement on the effects of oscillator MTBF.

Long-term stability (aging)

The Quartz Pro x-act is now available with low aging option down to 0,5 ppb per day or 50 ppb per year. The improved long-term stability is achieved by using *5^{th} overtone crystals* and in-house pre-aging.

A gradual change in frequency over days or months is known as aging. This occurs for various reasons, e.g., the physical properties of the crystal mounting may change. The crystal coefficient of elasticity changes when subjected to stress, or when trapped gasses escape, or when contaminants attach to or leave the crystal surface. Aging occurs at a relatively constant rate per decade for each crystal Therefore, to maintain an accurate frequency, periodic oscillator adjustments are made to remove the effects. Often, the adjustments are made more often in the beginning of the oscillator lifetime and more

seldom after the first year. Generally, the frequency of an oscillator can be varied a few cycles by a slight change in the phase of the feedback signal. This change is usually accomplished by an adjustable capacitor.