

Helping Customers Innovate, Improve & Grow



Vectron offers a High Temperature and High Stability OXCO (HX-171) product platform as a timing reference for extreme environment applications. Provided in a fully hermetic 28 x 38 mm package and driven by a proprietary doubly-rotated cut quartz resonator, with exceptional aging rate. HX-171 utilizes advanced oven controlled oscillator circuitry with firmware correction algorithm to accomplish unprecedented temperature stabilities of 5 ppb from -40°C to +150°C.

- BAW & SAW Design & Fabrication to produce high quality resonators.
- RF Oscillator Circuit Design.
- Established 250°C High Temperature Electronics Packaging Expertise.
- Established 250°C High Temperature Electronics Assembly & Test Expertise.
- Environmental Screening.

Vectron's manufacturing processes, from quartz resonator fabrication to oscillator electronics assembly and test, are painstakingly controlled via ISO and SPC procedures. Vectron fabricates high temperature quartz resonators using proprietary manufacturing processes designed specifically for high temperature and harsh environment applications. In order to ensure high reliability in the field, critical electrode metallization and testing processes are conducted inside state-of-the-art Class 1K cleanrooms. All high temperature oscillators are 100% tested before delivery.

- Wide operating temperature range -40°C to +150°C
- Frequency: 10 MHz or 20 MHz (consult factory for other frequencies)
- Tight temperature stability of +/-5ppb
- Design/Manufacture/Test in MHS, PA
- COO:USA
- EAR99

- Oil / Gas downhole tool
- Downhole seismic
- High temperature industrial process control
- Extended temperature Military/Aerospace
- Avionics



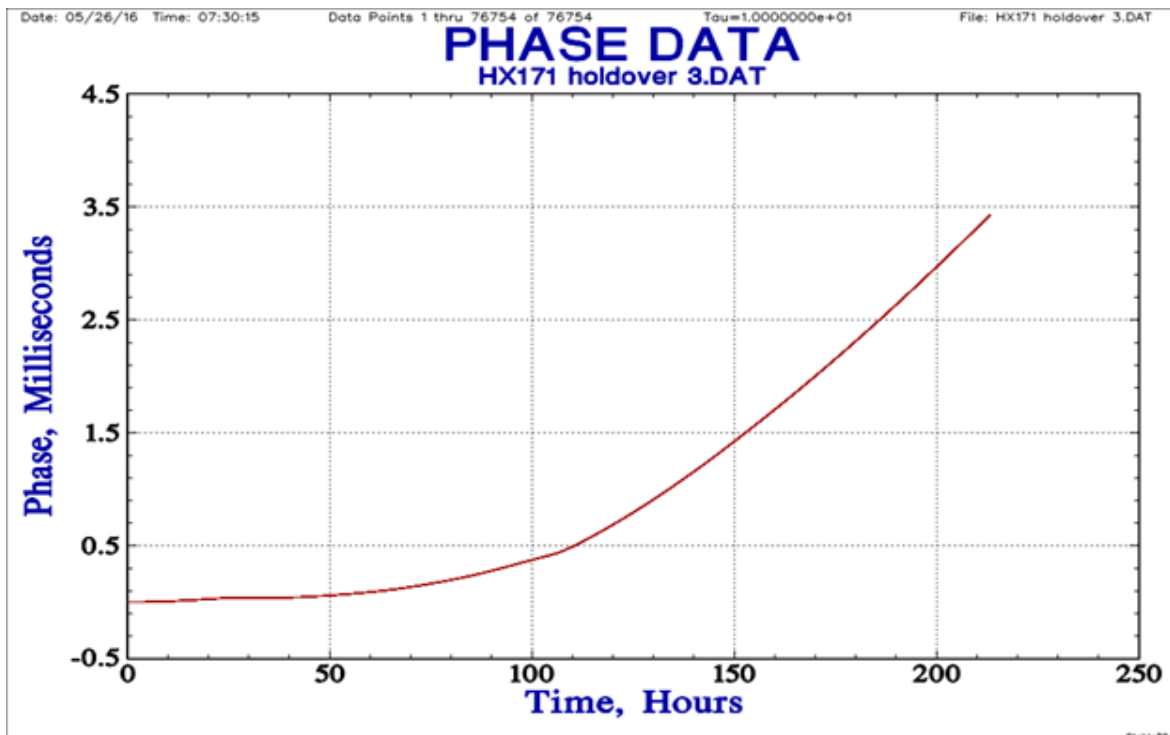
Performance Specifications

Frequency Stabilities ¹					
(Stabilities listed for 10 MHz. For stabilities above 10 MHz values may degrade. Please contact factory)					
Parameter	Min	Typical	Max	Unit	Condition
vs. operating temperature range (referenced to +25°C)	-5.0		+5.0	ppb	-40 to +150°C
Initial tolerance	-50		+50	ppb	at time of shipment, nominal EFC V _s ±5% Load ±5% after 24 hours of operation after 72 hours operation after 7 days of operation
vs. supply voltage change	-1		+1	ppb	
vs. load change	-0.2		+0.2	ppb	
vs. aging/day	-1.5		+1.5	ppb	
vs. aging/day	-0.7		+0.7	ppb	
vs. aging/day	-0.5		+0.5	ppb	
Holdover			5	ms	after 72-96 Hrs warm-up
Retrace	-10		+10	ppb	
Warm-up time			5	minutes	to ±10ppb of final frequency (1 hour reading) @ +25°C

Performance Specifications

Supply Voltage (Vs)					
Parameter	Min	Typ	Max	Units	Condition
Supply Voltage	4.75	5.0	5.25	VDC	Ordering code D
Power Consumption			6.0	Watts	during warm-up, all temperatures
			4.0	Watts	steady state @ +25°C
		5.0		Watts	steady state @ -40°C
		0.5		Watts	steady state @ +150°C
RF Output					
Start Time		1.5	3.0	s	time required to achieve 90% of amplitude
Signal [Standard]	HCMOS (subharmonics of 30dBc with 20MHz output)				
Load		15		pF	
Signal Level (Vol)			0.5	VDC	with Vs=5V and 15pF Load
Signal Level (Voh)	3.5			VDC	with Vs=5V and 15pF Load
Duty Cycle	40		60	%	@ (Voh-Vol)/2
Frequency Tuning (EFC)					
Tuning Range	±150		±400	ppb	(fixed frequency option available)
Linearity		10		%	
Tuning Slope	Positive				
Input Impedance		100		kOhm	
Bandwidth Modulation	150			Hz	

Holdover Plot

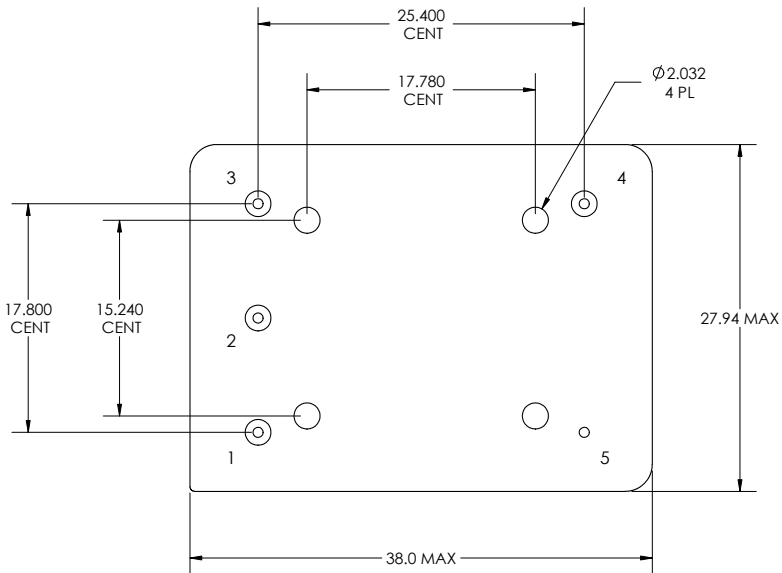
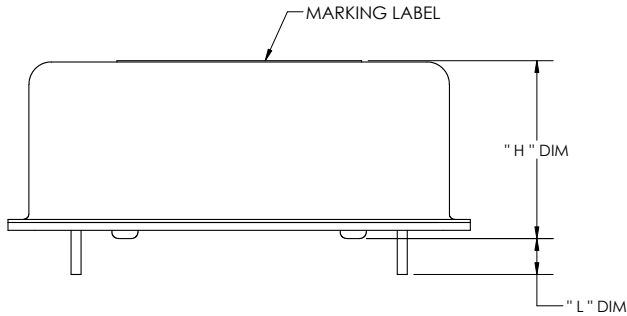


Additional Parameters					
Parameter	Min	Typ	Max	Units	Condition
Phase Noise ³			-90 -120 -138 -145 -150	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	1 Hz 10 Hz 100 Hz 1 KHz 10 KHz
Phase Noise ³			-90 -120 -135 -140 -145	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz	1 Hz 10 Hz 100 Hz 1 KHz 10 KHz
Allan Deviation			1e ⁻¹¹ 2e ⁻¹¹ 3e ⁻¹¹ 8e ⁻¹¹		1s tau 10s tau 100s tau 1000s tau
g-sensitivity		1	2	PPB/g	
Weight			30	g	

Absolute Maximum Ratings					
Supply			+7	VDC	
Output Load			50	pF	CMOS
Operable temperature range	-55		+160	°C	Operable temperature range implies the device will continue to operate with no long-term damage to unit; however, it will not be specification compliant outside the operating temperature range.

Environmental and Product Classification					
Shock (Endurance)	MIL-STD-202, Method 213, Condition J, 30g 11ms				
Sine Vibration (Endurance)	MIL-STD-202, Method 201 and 204, Condition A, except 5g to 500 Hz, 1 sweep each axia				
Random Vibration (Endurance)	MIL-STD-202, Method 214, Condition I-D				
Humidity	MIL-STD-202, Method 103, Condition B, 100% rh				
Seal	MIL-STD-202, Method 112, Condition D, hermetic, washable				
Altitude	MIL-STD-202, Method 105, sea level to space				
Resistance to Soldering Heat	MIL-STD-202, Method 210, Condition A,B,C				
Terminal Strength	MIL-STD-202, Method 211, Condition C (5 bends at 45° , 2 lbs)				
Moisture Sensitive Level	1				
RoHS	6 (fully compliant)				
Storage Temperature Range	-55		+125	°C	

Outline Drawing / Enclosure

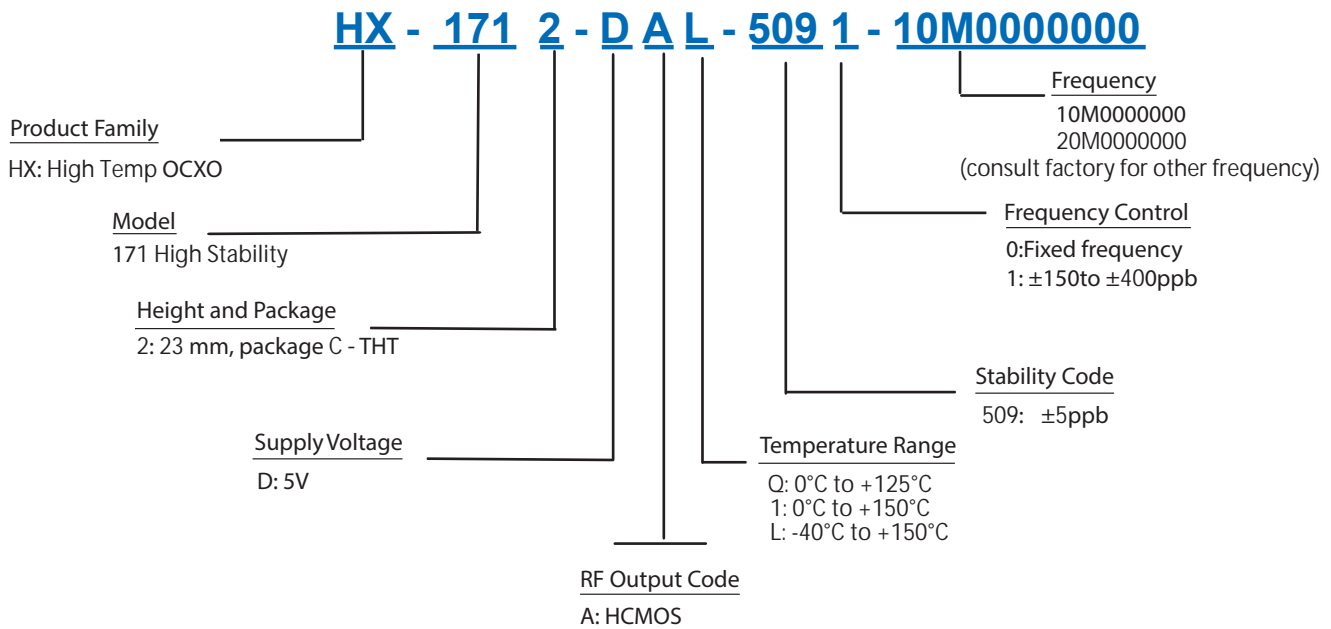


Dimensions in mm

Through hole Package configuration C		
	Height "H"	Pin Length "L"
2	23 max	4.5 mm min
Additional height options available- contact factory Note: lower height reduces stability		

Pin Connections	
1	Electronic Frequency Control Input (EFC) No Connect for Fixed frequency Oscillators
2	No Connect
3	Supply Voltage Input (Vs)
4	RF Output
5	Ground (Case)

Ordering Information⁴



Additional Ordering Options

Additional ordering options available include custom heights, custom aging rates, custom temperature ranges, custom temperature stabilities, custom phase noise requirements, improved g-sensitivity, and oscillators with voltage reference output on pin 2. These modifications require a custom dash number - please contact the factory for additional information.

Notes:

1. Unless otherwise stated, all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, and temperature (25°C).
2. Retrace defined as f1-fo where fo is the reading after the unit has been on power for 24 hours, and f1 is the frequency after 24 hours off followed by 60 minutes on.
3. Phase noise degrades with increasing output frequency.
4. Not all options and codes available at all frequencies.

For Additional Information, Please Contact

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