

Active Hydrogen Maser VCH-1003M

 vremya-ch.com/index.php/en/products-en/activehm-en/vch-1003m-en/index.html



The VCH-1003M is a high-performance hydrogen maser with low phase noise output signals. Extremely high frequency stability is provided by state-of-the-art technology and internal stand-alone Cavity Auto Tuning system.

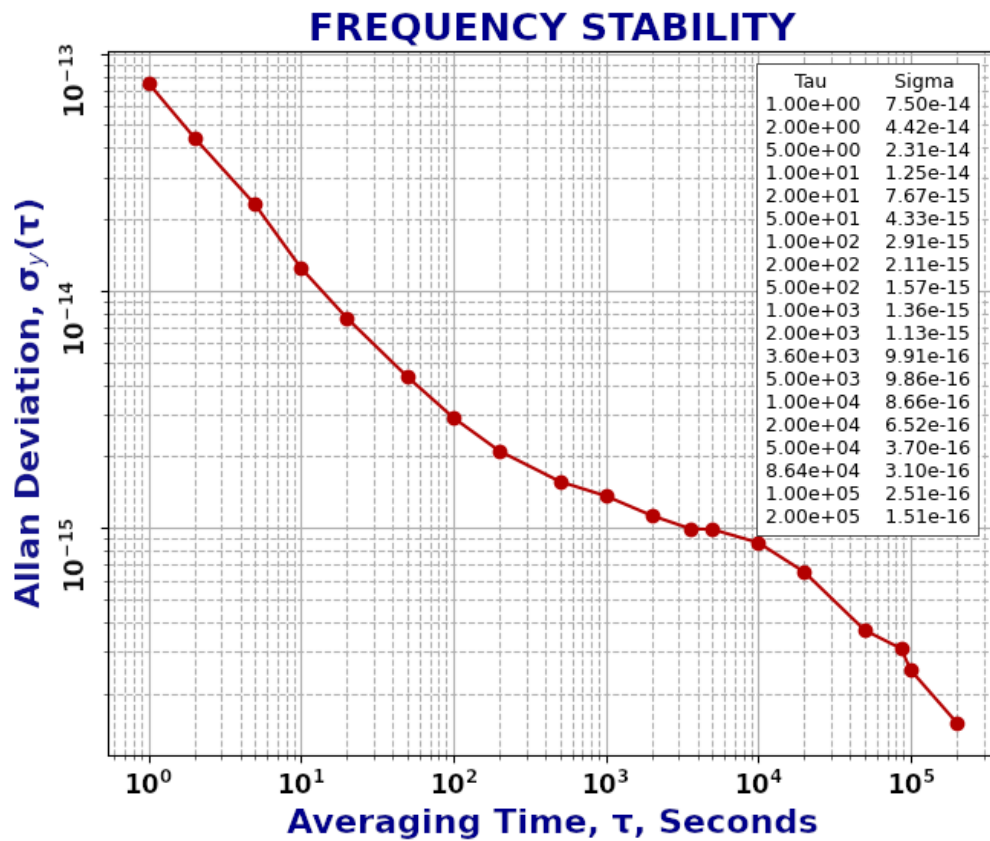
Key Applications

- National Time Keeping Service;
- Deep space tracking and navigation;
- VLBI systems;
- GNSS satellite monitoring.

Manual for VCH-1003M

- Operation Manual download
- User Guide download

Typical test results



Frequency stability (Option LT, 3 Hz bandwidth)

Specifications

Output signals:

two outputs: 5 MHz (sine), 1 ± 0.2 V RMS into 50 Ohms,
 two outputs: 10 MHz (sine), 1 ± 0.2 V RMS into 50 Ohms,
 two outputs: 100 MHz (sine), 1 ± 0.2 V RMS into 50 Ohms,
 two outputs: 1 Hz (pulse): Amplitude: > 2.5 V into 50 Ohms; width: (15 ± 5) μ s.
 Rise time: < 3 ns.

Metrological characteristics are given in the table:

		Standard	Option L		Option LT	
		3 Hz measuring bandwidth	0.5 Hz measuring bandwidth	3 Hz measuring bandwidth	0.5 Hz measuring bandwidth	
Frequency stability (Allan deviation)	1 s	$\leq 1.5 \cdot 10^{-13}$	$\leq 6 \cdot 10^{-14}$	$\leq 8 \cdot 10^{-14}$	$\leq 8 \cdot 10^{-14}$	
	10 s	$\leq 2.5 \cdot 10^{-14}$	$\leq 1.3 \cdot 10^{-14}$	$\leq 1.4 \cdot 10^{-14}$	$\leq 1.4 \cdot 10^{-14}$	
	100 s	$\leq 6 \cdot 10^{-15}$	$\leq 3.6 \cdot 10^{-15}$	$\leq 4.0 \cdot 10^{-15}$	$\leq 4.0 \cdot 10^{-15}$	
	1000 s	$\leq 2 \cdot 10^{-15} *$	$\leq 1.5 \cdot 10^{-15} *$	$\leq 1.5 \cdot 10^{-15}$	$\leq 1.5 \cdot 10^{-15}$	
	1 s	$\leq 1.5 \cdot 10^{-15}$	$\leq 1.5 \cdot 10^{-15} *$	*	$\leq 1.0 \cdot 10^{-15}$	
	1 hour	*	$\leq 5.0 \cdot 10^{-16} *$	$\leq 1.5 \cdot 10^{-15}$	$\leq 4.0 \cdot 10^{-16}$	
	1 day	$\leq 5 \cdot 10^{-16} *$		$\leq 5.0 \cdot 10^{-16}$	**	
Long term		$< 3.0 \cdot 10^{-16}$ per day***				
Auto tuning		no external reference required				
Frequency accuracy		$\pm 3 \cdot 10^{-13}$				
Temperature sensitivity		$< 1.5 \cdot 10^{-15} / ^\circ\text{C}$				
Magnetic sensitivity		$\leq 5 \cdot 10^{-15} / \text{Gauss}$				
Frequency trim range		$1 \cdot 10^{-10}$				
Setting resolution		$1 \cdot 10^{-16}$				

* Specified only under laboratory conditions: ambient temperature in the range $\pm 1 ^\circ\text{C}$, changing rate $< 1 ^\circ\text{C}/\text{hour}$. ADEV at 1 day is specified for measurements with removed linear frequency drift.

**Specified only under laboratory conditions: ambient temperature in the range $\pm 0.1 ^\circ\text{C}$, changing rate $< 0.3 ^\circ\text{C}/\text{hour}$. ADEV at 1 day is specified for measurements with removed linear frequency drift.

***Achieved after 1 year of unperturbed, continuous operation.

Phase noise (SSB Phase Noise, dBc/Hz):

Standard	Option L	Option LT
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Offset from carrier	5 MHz	10 MHz	100 MHz	5 MHz	10 MHz	100 MHz	5 MHz	10 MHz	100 MHz
1 Hz	≤-118	≤-112	≤-92	≤-130	≤-121	≤-100	≤-122	≤-116	≤-96
10 Hz	≤-135	≤-129	≤-109	≤-141	≤-135	≤-115	≤-135	≤-129	≤-109
100 Hz	≤-149	≤-143	≤-122	≤-151	≤-145	≤-125	≤-149	≤-143	≤-122
1 kHz	≤-156	≤-149	≤-122	≤-156	≤-150	≤-130	≤-156	≤-149	≤-130
10 kHz	≤-158	≤-150	≤-152	≤-159	≤-153	≤-153	≤-158	≤-152	≤-152
100 kHz	≤-158	≤-150	≤-152	≤-159	≤-153	≤-153	≤-158	≤-152	≤-152

Harmonic distortion in 5 MHz output: ≤-30 dB (Standard, Option LT), ≤ -40dB (Option L).

Non-harmonic distortion: <-100 dB in the range from 10 Hz to 10 kHz.

Full data monitoring and functions control. Application software running under Microsoft Windows and Linux (optional).

Power supply: AC(84÷264)V, (47÷60)Hz; DC(22÷30)V.

Power consumption: 150 V·A (AC), 100 W (DC).

Operating temperature range: 10...35 °C.

Storage temperature range: -30...50 °C.

Weight: 105 kg.

Dimensions (W×H×D): 550×1010×550 mm.

Warranty: 3 years (7 years extended).

Lifetime: 15 years.