Transportable Hydrogen Clock VCH-2020

vremya-ch.com/index.php/en/products-en/activehm-en/vch-2020-en/index.html

The main application is a high precision time scale and frequency comparison/calibration of distant time keeping laboratories.

Key Applications
– National Time Keeping Service;
– Scientific institutes and universities;
– Radio Astronomy (VLBI);
– Ground support systems for GNSS.

Output signals:
one output: 5 MHz (sine), 1±0.2 V RMS into 50 Ohms,
one output: 10 MHz (sine), 1±0.2 V RMS into 50 Ohms,
one output: 100 MHz (sine), 1±0.2 V RMS into 50 Ohms,
one output: 1 Hz (pulse): Amplitude: >2.5 V into 50 Ohms; width: (15±5) μs.
Rise time: <3ns.
Sync. input to output <25ns.
The time keeping accuracy during the 12-hour transportation (without relativistic effects): ≤1.0 ns.

Frequency stability σy (3, τ) :

	Cavity tuning system time constant		
	τ~50 s		**τ~2000 s**
Time domain	**for use during 12-hour transportation**	**for use in lab**	**for use in lab**
1 s	$\leq 3.0 \cdot 10^{-13}$	$\leq 1.5 \cdot 10^{-13}$	$\leq 1.5 \cdot 10^{-13}$
10 s	$\leq 3.0 \cdot 10^{-14}$	$\leq 3.0 \cdot 10^{-14}$	$\leq 3.0 \cdot 10^{-14}$
100 s	$\leq 1.2 \cdot 10^{-14}$	$\leq 1.2 \cdot 10^{-14}$	$\leq 6.0 \cdot 10^{-15}$
1000 s	$\leq 4.0 \cdot 10^{-15}$	$\leq 3.5 \cdot 10^{-15}$	$\leq 2.0 \cdot 10^{-15}$
3600 s	$\leq 3.0 \cdot 10^{-15}$	$\leq 2.0 \cdot 10^{-15}$	$\leq 1.5 \cdot 10^{-15}$

10 000 s	—	≤$1.5 \cdot 10^{-15}$	≤$1.0 \cdot 10^{-15}$
1 day	—	≤$5.0 \cdot 10^{-16}$	≤$5.0 \cdot 10^{-16}$

When transporting the THC in working order, the following conditions must be met:
– ambient temperature from plus 20 to plus 25 °C;
– relative humidity up to 90% at a temperature of plus 25 °C;

Phase noise at 5 MHz output

1 Hz	≤−118 dBc/Hz
10 Hz	≤−130 dBc/Hz
100 Hz	≤−150 dBc/Hz
1 kHz	≤−155 dBc/Hz
10 kHz	≤−155 dBc/Hz
100 kHz	≤−155 dBc/Hz

Temperature sensitivity is less than $1.5 \cdot 10^{-15}$ /°C.
Magnetic field sensitivity is less than $1.0 \cdot 10^{-14}$ /Gauss.
Dimensions are 520 mm wide by 554 mm deep by 965 mm high.
Weight is 70 kg.
Consumption ≤80 W during transportation.
The device can operate both from 85-264 VAC and on an external DC source either from 12 to 15VDC or from 22 to 30 VDC.
The built-in battery provides 4 hours of autonomous operation.