Quartzlock CH1-76A

Passive Hydrogen Maser

- High long-term and short-term frequency stability
- Small size and weight

DESCRIPTION

The CH1-76A Passive Hydrogen Maser is designed to operate as a high-stability frequency source with precise, spectrally pure 5 MHz output.

The CH1-76A is the first in the world Time and Frequency Hydrogen Maser of a passive type. Its principle of operation is based on hydrogen atom emission, but hydrogen atoms emit only by the action of an external signal from a crystal oscillator. The quantum device is used as a frequency discriminator in an automatic frequency tuning system of a crystal oscillator.

APPLICATIONS

National time and frequency services, ground control and surveillance points of satellite radionavigation systems.

GENERAL

Power: 220±22V, 50±1Hz, 220±11V, 115±6V, 400Hz
At power line failure the instrument automatically switches to an external 22–30V DC Power Supply
Power consumption: 140VA, 90W
Operating temperature range: 5–40°C
Storage temperature range: –50–+50°C
Humidity: up to 80% at 25°C
Dimensions: 480 x 280 x 555mm
Weight: 51kg
Lifetime: 15 years

Passive Hydrogen Maser Specifications	
Outputs	5MHz (sine), 1±0.2V rms into 50 Ohm, 1Hz (pulse)
Amplitude	>2.5V into 50 Ohm
Width	10–20ms
Rise time	<30ns
Jitter	<0.1ns
Frequency stability, sy (2, t): 1s 10s 10^2s 10^3s 1h 1 day	 $\leq 8\times10^{-13}$ (in 2 Hz measurement BW) $\leq 2\times10^{-13}$ $\leq 7\times10^{-14}$ $\leq 3\times10^{-14}$ $\leq 2\times10^{-14}$ $\leq 5\times10^{-15}$
Ageing	$<1\times10^{-15}$/day
Accuracy	$\pm1.5\times10^{-12}$/year
Temperature coefficient of frequency	$\leq1\times10^{-14}$/ °C
Magnetic field sensitivity	$\pm2\times10^{-14}$/Gauss
Frequency trim range	1×10^{-10}
Setting resolution	1×10^{-14}
Phase noise Offset from carrier 1Hz 10Hz 100Hz 1kHz 10kHz	 SSB phase noise, dBc/Hz −100 −120 −140 −150 −150
Harmonic distortion	< 30dB
Non-harmonic distortion	< 100dB

See Quartzlock Hydrogen Maser compatible instrumentation
A5 Distribution Amplifier
A6 Frequency Converter
A7 Signal Stability Analyzer