

AMRL004 series frequency stabilized phase locked laser for wind lidar



DESCRIPTION

AMRL-004 series frequency-stable phase-locked light source is widely used in the fields of lidar, precision spectrum, sensor and measurement. It consists of two important modules: frequency stabilization control and phase locking control.

Laser frequency stabilization module is designed with modular miniaturization. A narrow linewidth laser, a gas absorption optical circuit and an electronic feedback module are integrated. Supports absorption edge midpoint frequency stabilization and PDH frequency stabilization. Seed laser output with 100 mW frequency stability is achieved.

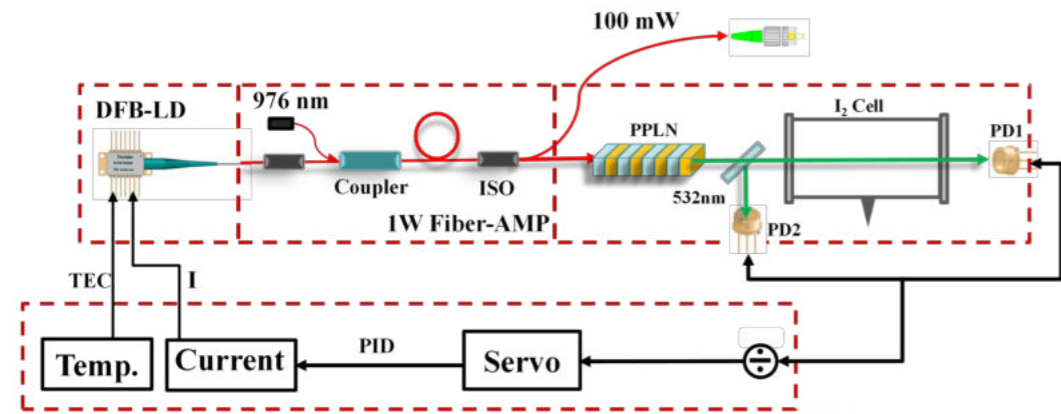
The phase-locked control electronics module supports maximum 10GHz frequency shift range and 2MHz phase-locked accuracy. The module includes: high-precision seed-driven temperature control circuit, digital frequency and phase discriminator and loop filter, PID feedback control circuit of LD current, PID feedback control circuit of LD temperature control, multi-channel AD acquisition and DA output.

Multi-level environmental control system and power feedback technology improve the long-term frequency stability and environmental adaptability of the module. The peak of laser frequency change is 6MHz at 17°C. Under ambient temperature (temperature difference < 3°C), the peak of output laser frequency is <2MHz, RMS value is <0.3MHz, and the best value of Allen variance value is 9.8×10^{-11} @10 S, for long hours at 10^{-9} @8000s.

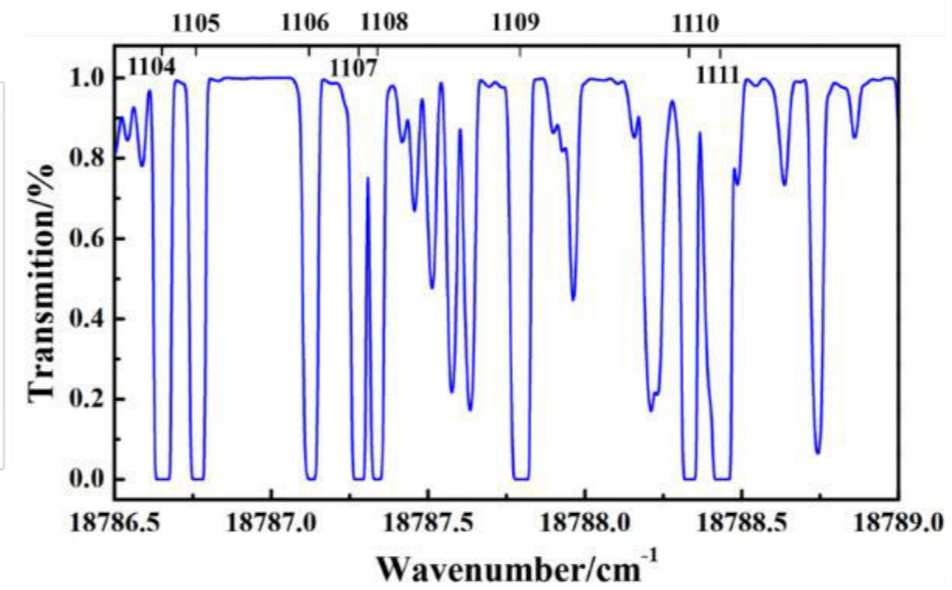
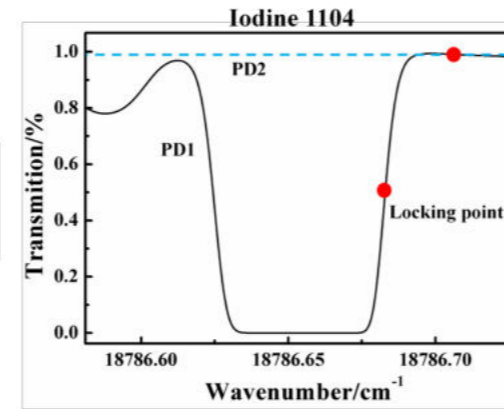
PARAMETERS

Parameter	Data
Model	UL-50mW-1064nm-AMRL004
Wavelength	1064.4nm
Output light power	> 50mW
Working mode	CW
Line width	< 2MHz
Frequency stability (RMS)	< 1MHz @ 24 h @ 3°C Temperature difference
Power stability (RMS)	≤1%@ 25°C
Repeated locking error	< 100MHz
Relative intensity noise	< -140@10MHz
Frequency stabilization range	Iodine molecule 1104-1110 absorption line
Lock position	Midpoint of absorption line
Frequency shift range (optional)	±5GHz
Lock-in accuracy (optional)	2MHz
Output mode	Optical fiber output, FC/APC
Communication interface	RS422 communication protocol
Power supply	220V AC
Size	3.5u chassis
Working temperature	15 ~ 30°C
Storage temperature	0 ~ 50°C
Relative humidity	0 ~ 60%

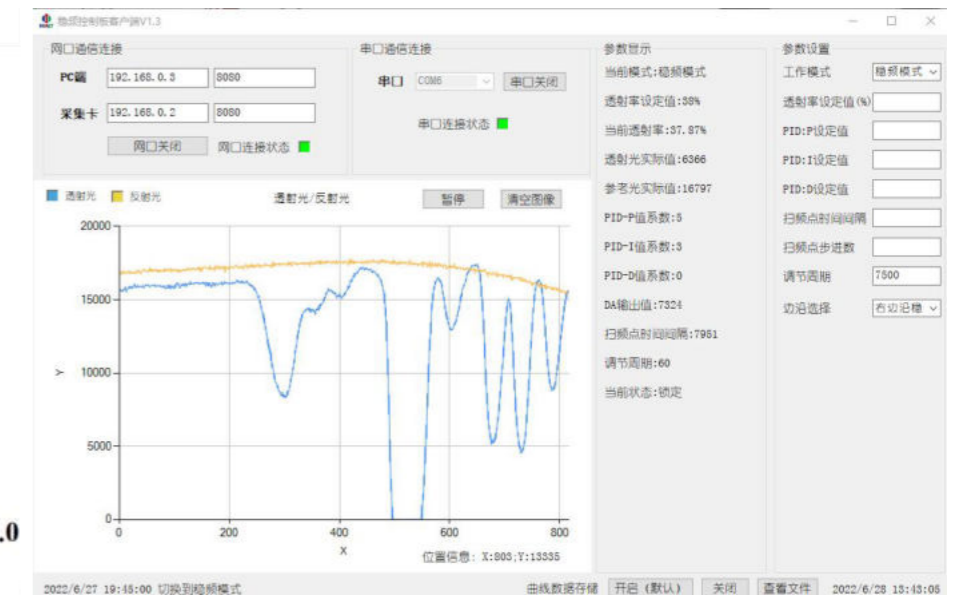
STEADY FREQUENCY CHARACTERISTICS



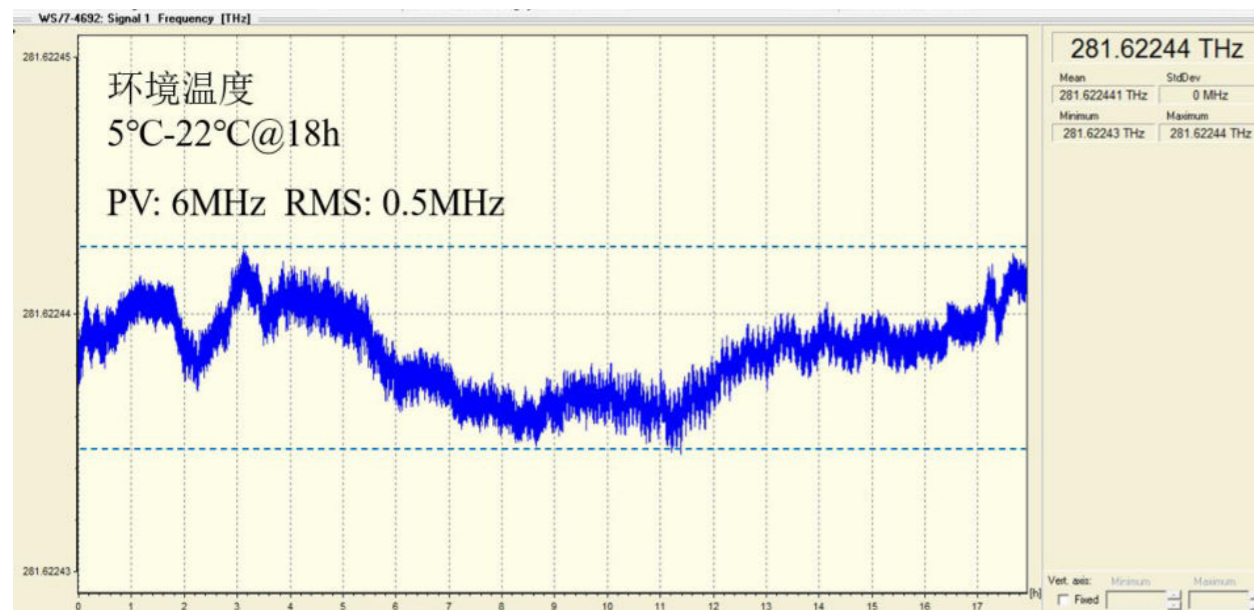
Sideline frequency stabilization principle



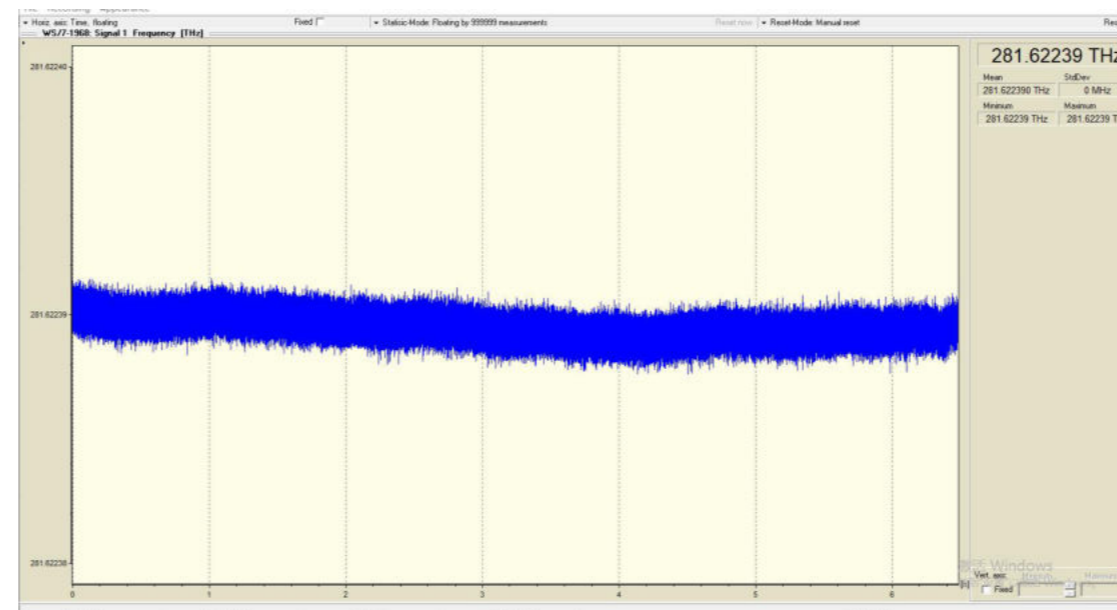
Iodine molecules often use absorption lines



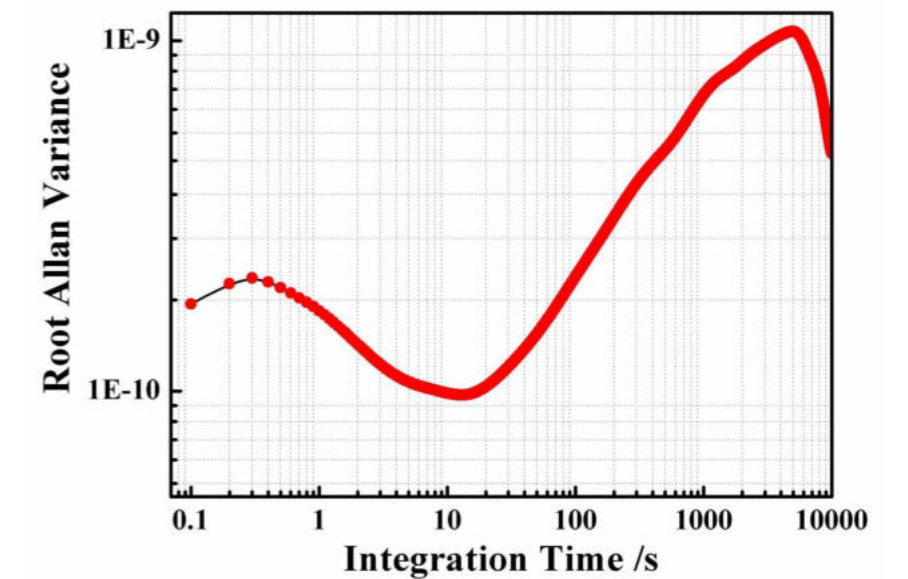
Frequency stabilization control software



Frequency stability under temperature difference of 17°C

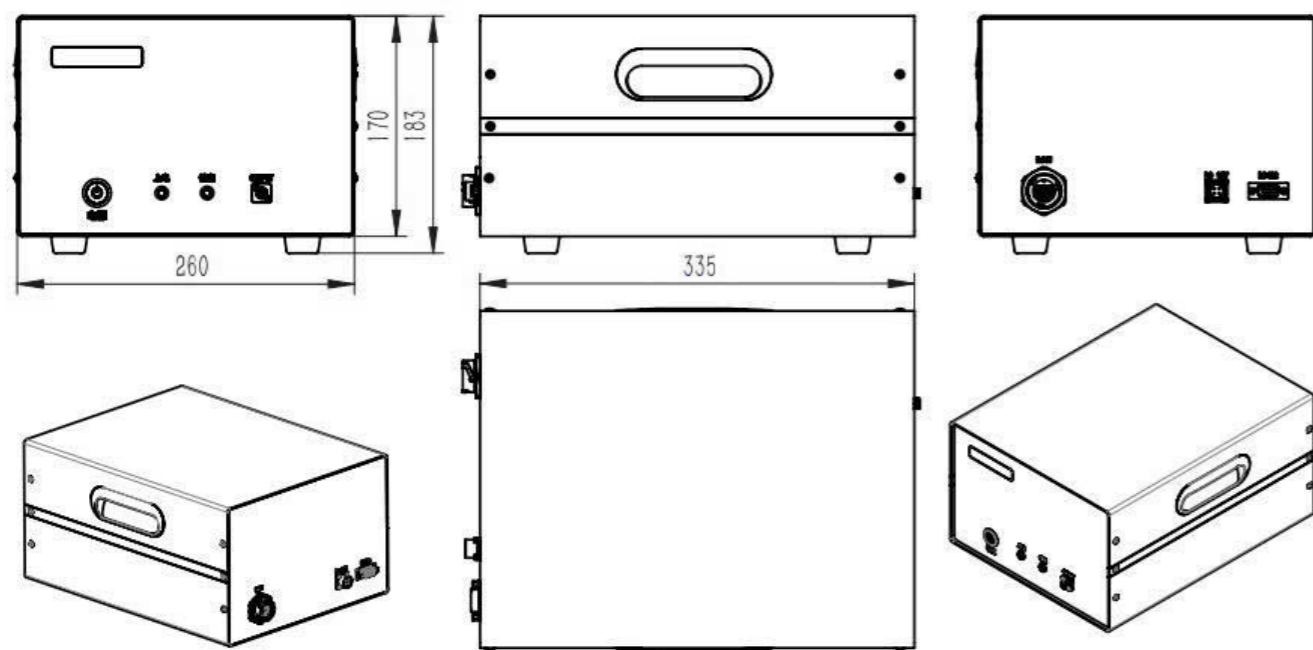


6 hours of frequency stabilization test for frequency stabilization module at room temperature

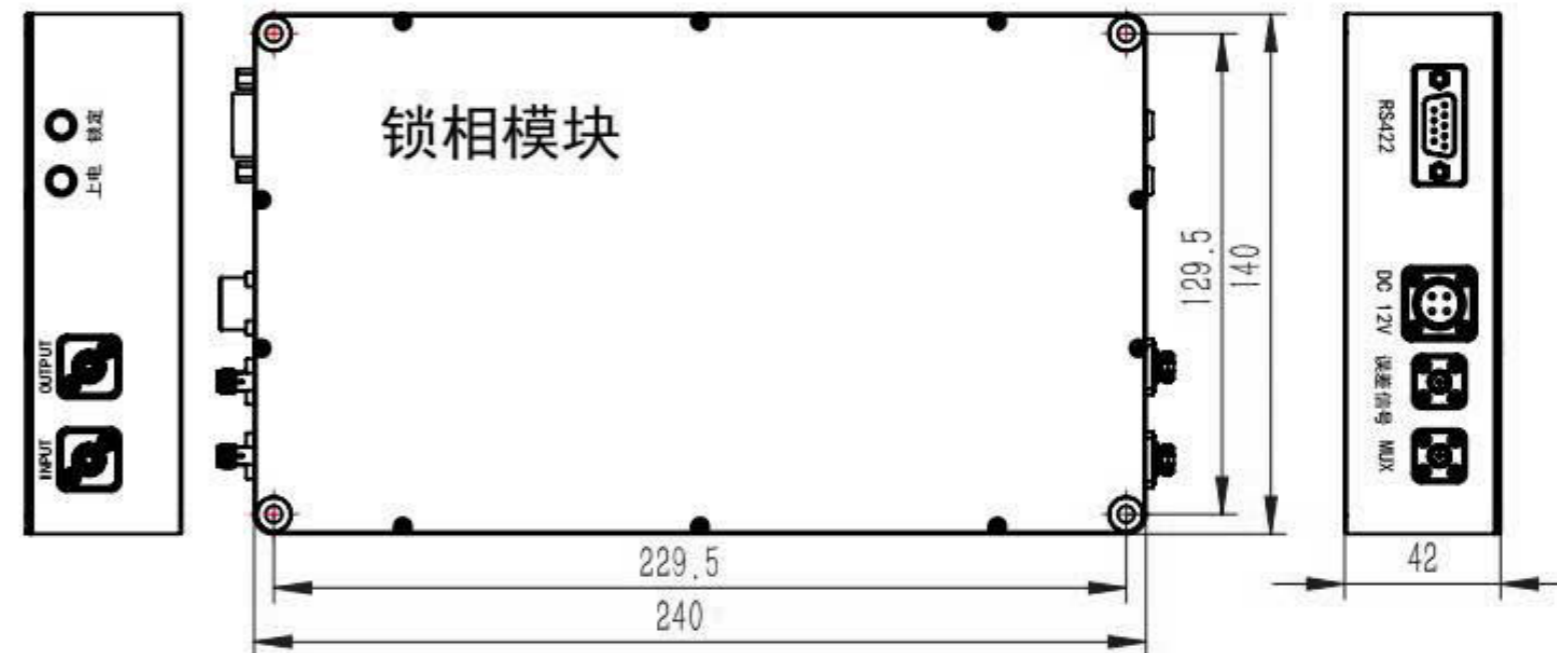


Frequency stability of Allen variance at different integration times at room temperature

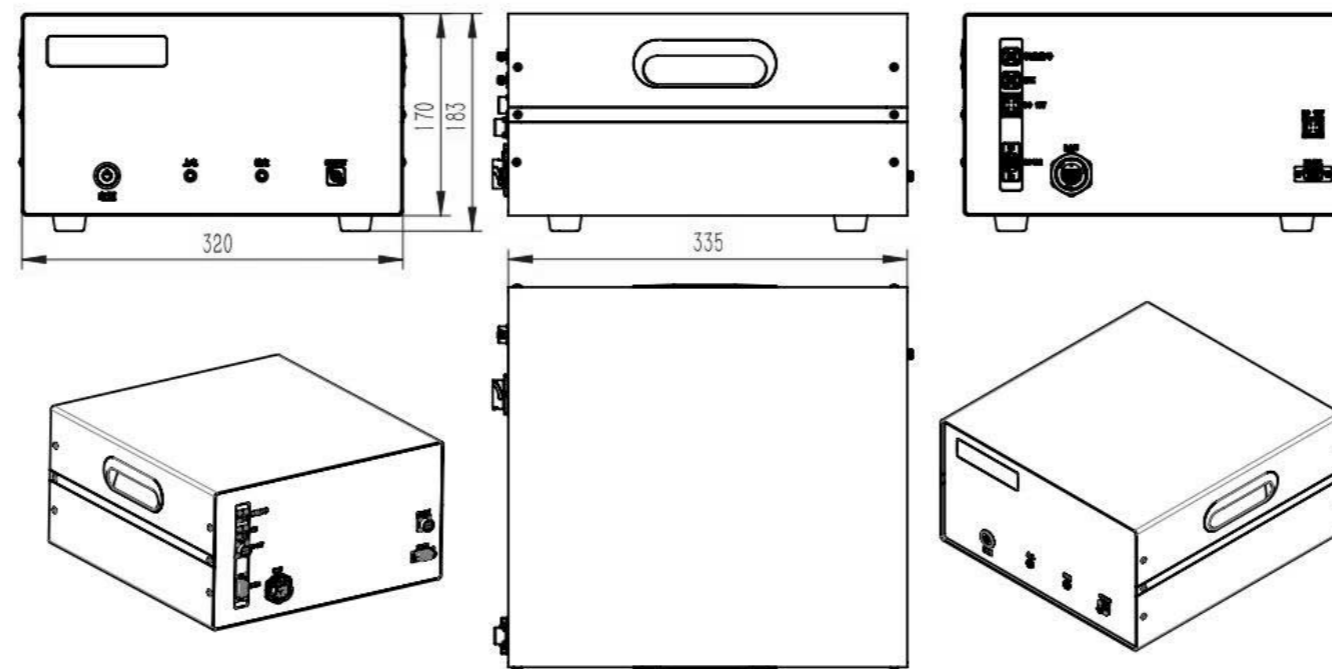
OUTLINE SIZE(mm)



Stabilized module



Phase locking module



Frequency stabilization phase locking module