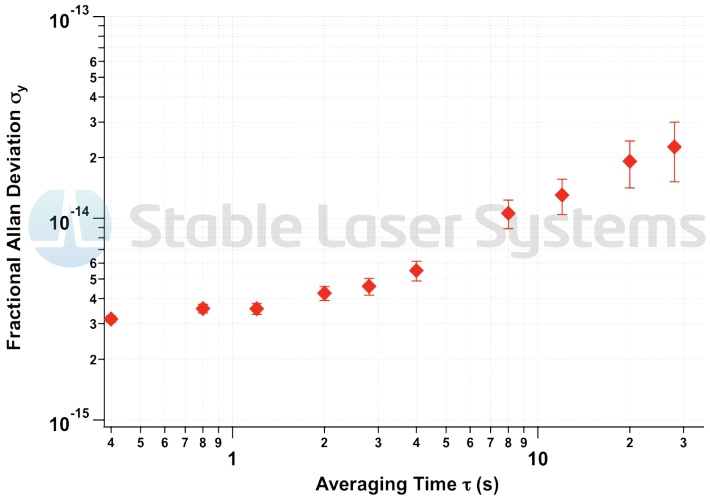
Hz-Level Rack Mounted Laser System
SLS-INT-1550-100

Stable Laser Systems

OBTAIN 1 HZ AT THE PUSH OF A BUTTON – LESS THAN 5 × 10^{-15} FRACTIONAL DEVIATION!



The deviation of a Stable Laser Systems integrated frequency-stabilized laser system, as measured by heterodyning against a more stable system. Hertz-level linewidths are realized. Exact performance may differ due to natural variability in the thermal noise of mirror coatings.

Our fully integrated cavity-stabilized laser system has been engineered to maximize performance and convenience in a **compact footprint**, combining **high precision** and **ease of use.**

UNCOMPROMISED PERFORMANCE

Everything needed to stabilize your laser has been incorporated into a convenient **19-inch, 6U rackmount box**. This self-contained system includes a high-finesse Fabry-Perot cavity, temperature-controlled vacuum housing, vacuum pump, laser source, optics, and control electronics. Designed for portability and performance, it maintains the frequency stability for which our products are known: the frequency noise spectral density of **1 Hz/√Hz** is ideal for applications such as microwave generation and laser radar.

INTELLIGENT DESIGN FOR EASE OF USE

Once the laser has been tuned to be coincident with the cavity frequency, a **single-switch lock function** engages the loop filter to stabilize the laser. An **easy-to-read front panel** displays the necessary diagnostics, including laser current and temperature, cavity temperature, reflected power from the cavity, loop filter parameters, and vacuum parameters. Analog outputs are provided for monitoring the transmitted cavity power, error signal, and synchronous frequency ramp signal. Added benefits include low power consumption and optional battery backup.

Decades of laser stabilization experience has gone into this optimally engineered system. With minimal user maintenance, our systems give you the frequency you need — guaranteed.

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SPECIFICATIONS

PRODUCT NOTES

- Fully integrated 1-Hz stabilized laser system
- Turn-key, front panel locking interface
- System delivered aligned and under vacuum – fully operational within hours. Shipped with battery-powered vacuum pump to minimize setup after shipping
- Available in 2 configurations:
  - 1 Hz linewidth system in 6U rack-mount box
  - 3 Hz linewidth system in a 3U high rack-mount box

PERFORMANCE

Wavelength range	Telecommunications C-band (1530 – 1565 nm)
Output power	10 mW, 20 mW (optional)
Stabilized laser linewidth	< 1 Hz (measured over integration times of 1 s, via heterodyne with linear drift removed) with better performance on a best-effort basis
Daily laser drift	< 20 kHz for operating temperature range
Operating temperature range	18-25 °C
Temperature drift	< 7 mK/°C of room temperature change
Thermal insulation leakage	< 0.3 W/°C of room temperature change
Cavity mounting accuracy	Within 1 mm of can axis
Leak rate (tested with helium)	< 10-9 cc/s (standard)
Vacuum pressure	$\leq 1\times10^{-6}$ Torr

MONITOR OUTPUT

- Laser current and temperature (set and actual)
- Cavity temperature
- Reflected power from the cavity
- Vacuum pressure
- Vacuum housing temperature
- Loop filter proportional gain
- Loop filter time constant

ANALOG OUTPUTS

- PDH error signal
- Transmitted power from the cavity
- Synchronous frequency ramp signal

ELECTRONICS

Operating voltage	110/115/230 VAC
Power consumption	< 50 W
AC Power	50-60 Hz
Cooling requirements	None
Optional battery backup for ion pump	3-Day Lifetime

MECHANICAL & OPTICS

Output connector	FC/APC, PM-1550
Dimensions	19" rack mountable housing, 6U high (45 x 27 x 62 cm)
System Weight	< 40 kg
Vibration Isolation	< 50 kg
Vibration Isolation	Included