

# Hz-Level Rack Mounted Laser System SLS-INT-1550-200-1



Obtain <1 Hz at the push of a button—less than  $3 \times 10^{-15}$  fractional deviation!

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

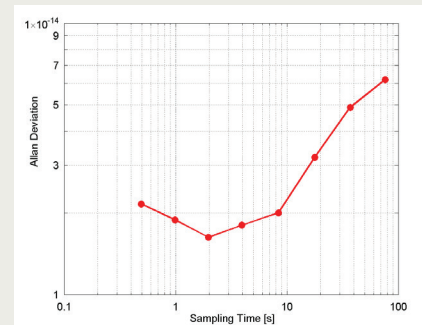
## UNCOMPROMISED PERFORMANCE

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/ $\sqrt{\text{Hz}}$**  is ideal for applications such as microwave generation and laser radar.

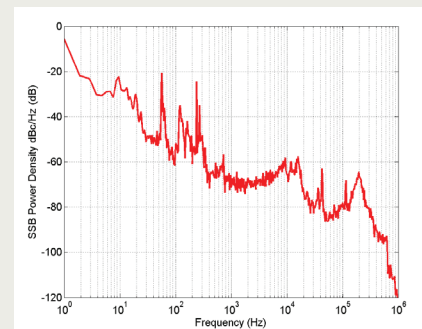
## INTELLIGENT DESIGN FOR EASE OF USE

Once the laser has been tuned to be coincident with the cavity frequency, a **push-button lock function** engages the loop filter to stabilize the laser. An **intuitive, integrated touch screen** allows control of laser current, laser temperature, loop filter parameters, as well as displaying the necessary diagnostics, including cavity temperature, reflected and transmitted power from the cavity, and vacuum parameters. Analog outputs are provided for transmitted and reflected photodetectors, error signal, and synchronous frequency ramp signal.

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



The Allan 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.



The phase noise power spectral density of the laser.

# Hz-Level Rack Mounted Laser System

## SLS-INT-1550-200-1

# SPECIFICATIONS

### PRODUCT NOTES

- Fully integrated <1-Hz stabilized laser system in a 6U rack-mountable enclosure
- Turn-key, front panel, touchscreen locking interface or laptop GUI alternative
- System delivered aligned and under vacuum—fully operational within hours.
- Auto relock technology detects drops and quickly scans and relocks the laser

### TOUCHSCREEN CONTROLS AND INDICATORS

- Laser current and temperature (set and actual)
- Cavity temperature
- Vacuum pressure
- Vacuum housing temperature
- Loop filter proportional gain and time constant

### PERFORMANCE

Wavelength range	Telecommunications C-band (1530 – 1565 nm) chosen at ordering. Please call us for any other wavelengths.
Output power	10 mW, 80 mW
Cavity Free Spectral Range	3 GHz
Allan Deviation 1 s no drift removal	<3e-15
Allan Deviation 10 s no drift removal	<3e-14
Phase noise 10 Hz offset	<-20 dBc/Hz
Phase noise 10 kHz offset	<-53 dBc/Hz
Daily laser drift	< 20 kHz for operating temperature range
Daily frequency variation linear drift removed	<500 Hz
Operating temperature range	18-25 °C

### ANALOG OUTPUTS

- PDH error signal
- Transmitted power from the cavity
- Reflected power from the cavity
- Ramp sync signal

### ELECTRONICS

Operating voltage	110/115/230 VAC
Power consumption	< 25 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	Included

### OPTIONS

- Frequency tuning of locked laser +/- 400 MHz (for details or more range, please call us)
- Cavity reconditioning to tune the resonance to be within 150 MHz of an absolute frequency



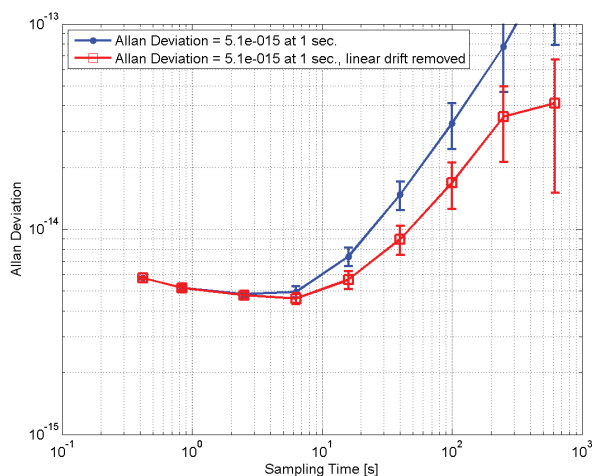
## THIS TURNKEY 3HZ LINEWIDTH STABILIZED LASER

offers excellent stability in a convenient rackmount box. We've integrated a high-finesse Fabry-Perot cavity, a temperature-controlled vacuum housing, vacuum pump, optics, input laser, and control electronics into a **4U high rackmount box**, while maintaining the frequency stability for which our products are known. With a frequency noise linear spectral density of **1Hz/ $\sqrt{\text{Hz}}$** , this system is suitable for applications such as microwave

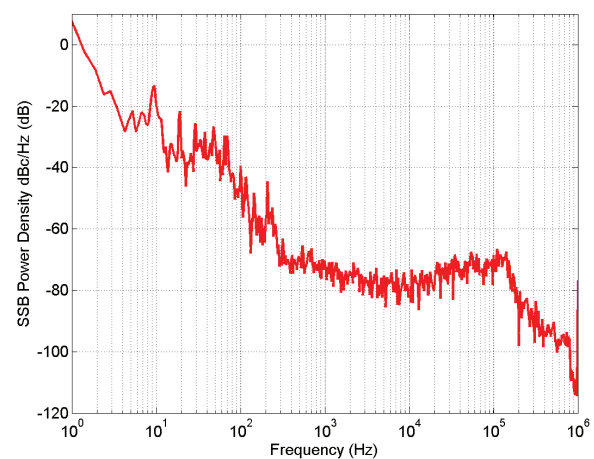
generation and laser radar. Once the laser has been tuned to be coincident with the cavity frequency, a **push-button lock function** engages the loop filter to stabilize the laser. An **intuitive, integrated touch screen front panel** allows control and monitoring of all system parameters, with analog outputs for cavity power, error signal, and ramp sync signal.

Everything about this integrated frequency stabilized laser has been designed to deliver the best performance in the most convenient way, from the low power consumption to the onboard display. We put all of our experience into each system so that you can spend your time on your experiments, not your equipment.

**OUR SYSTEMS GIVE YOU THE FREQUENCY YOU NEED — GUARANTEED.**



The Allan Deviation of a single laser from a heterodyne beat.



The phase noise linear spectral density of the laser.

# Hz-Level Rack Mounted Laser System

## SLS-INT-1550-200-3

# SPECIFICATIONS

### PRODUCT NOTES

- Fully integrated 3-Hz stabilized laser system in 4U rack-mount box
- Turn-key, front panel touchscreen interface with laptop GUI alternative
- System delivered aligned and under vacuum—fully operational within hours
- Auto relock technology monitors the system and quickly scans and relocks the laser after disturbances

### TOUCHSCREEN CONTROLS AND INDICATORS

- Laser current and temperature (set and actual)
- Cavity temperature
- Vacuum pressure
- Vacuum housing temperature
- Loop filter proportional gain and time constant

### PERFORMANCE

Wavelength range	Telecommunications C-band (1530 – 1565 nm) chosen at time of ordering
Output power	10 mW
Cavity Free Spectral Range	6 GHz
Allan Deviation 1 s no drift removal	<9e-15
Phase noise 10 Hz offset	<-20 dBc/Hz
Phase noise 10 kHz offset	<-53 dBc/Hz
Daily laser drift	< 40 kHz for operating temperature range
Daily frequency variation linear drift removed	<1 kHz
Operating temperature range	18-25 °C

### ANALOG OUTPUTS

- PDH error signal
- Transmitted power from the cavity
- Reflected power from the cavity
- Ramp sync signal

### ELECTRONICS

Operating voltage	110/115/230 VAC
Power consumption	< 25 W
AC Power	50-60 Hz
Cooling requirements	None
Optional battery backup for ion pump	3-Day Lifetime

### OPTIONS

- Frequency tuning of locked laser +/-400 MHz (for details or more range, please call us)
- Cavity reconditioning to tune the resonance to be within 300 MHz of an absolute frequency

### MECHANICAL & OPTICS

Output connector	FC/APC, PM-1550
Dimensions	19" rack mountable housing, 4U high (45 x 18 x 38 cm)
System Weight	< 40 kg
Vibration Isolation	Included