

**Applications:**

- biomedical imaging
- optical coherence tomography
- spectroscopy
- optical metrology

**Features:**

- 3-mW output power ex fiber.
- Tuning/sweeping range adjustable up to 50 nm.
- Instantaneous linewidth of less than 0.05 nm.
- 200 Hz sweep rate over 50 nm.
- 2 kHz sweep rate over 5 nm.
- 1 kHz wavelength alternation rate for any two selected wavelengths within full tuning range.
- PM- or SM-fiber output.
- Powered directly from a wall outlet.
- RS-232 remote control capability.



**Description:**

**BroadSweeper BS840** is a widely tunable external cavity laser based on a broadband SOA in a 840-nm band. Fast and narrow-band Acousto-Optic Tunable Filter (AOTF) is used as a selective intracavity element for tuning and sweeping the laser wavelength. Active temperature control of AOTF ensures excellent stability of the wavelength. The absence of moving parts in external cavity ensures high accuracy of wavelength setting and excellent sweep-to-sweep reproducibility of an instantaneous wavelength. A specially designed power control loop allows the BroadSweeper to demonstrate a flat-top tuning characteristic even at the maximum tuning rate.

The following modes of operation are available for the standard version:

- Operation at any selected wavelength within the full tuning range.
- Alternation of the two desired wavelengths (any two wavelengths from the full tuning range may be chosen).
- Linear sweep of wavelength with a rate of 200 Hz over the full tuning range (50 nm), and of 2 kHz over any 5-nm interval within the full tuning range.

BroadSweeper's external cavity is based on a PM-fiber. The standard version is shipped with FC/APC-terminated SM-fiber cable for connection to the optical adapter on the front panel. Output power is measured at the end of this cable. PM-PANDA-fiber cable with main polarization aligned to the key of the connector is optionally available upon request.

**Performance parameters:**

Output power ex SM fiber, full power mode	≤ 3 mW (measured at 860 nm)
Output power ex SM fiber, low power mode	≤ 1 mW (measured at 860 nm)
Output power variations within tuning range	20 % max.
Center wavelength, nm	850 nm typical
Tuning range, full power mode	> 45 nm, 50 nm typical
Tuning range, low power mode	> 50 nm, 55 nm typical
Line structure	Multiple external cavity modes
Instantaneous linewidth	Typical 0.04 nm, maximum 0.05 nm
Sidemode suppression (outside of the emitting line)	> 50 dB
Polarization ratio (at the front-panel optical output)	20 dB typical
Fiber output	FC/APC sleeve, SM-or PM-PANDA-fiber

Power requirements	110VAC or 220VAC, 15 W
Operating temperature range	+15 °C to +35 °C
Physical dimensions	316 x 257 x 161 mm
Weight	6 kg

### Sweep mode.

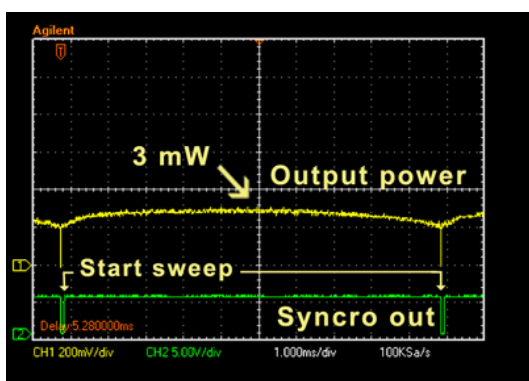
Maximum sweep rate (5-nm sweeping)*	2 kHz
Maximum sweep rate (50-nm sweeping)*	200 Hz
Sweep rate*	2 – 10000 nm/s
Retrace time**	100 μs – 10 ms
Wavelength deviation from linear dependence during sweep	≤ 0.05 nm

\* Sweep rate depends on sweep range. The limit of sweep range is 5 nm with the sweep rate of 2 kHz.

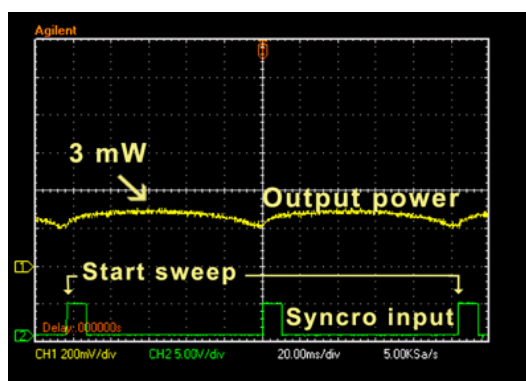
\*\* Retrace time depends on sweep rate. Retrace time increases as sweep rate decreases.

Note: sweeps can be triggered internally (automatic mode) or externally (by an external TTL pulse).

### Examples – sweep mode.



Automatic sweeping at 100 Hz

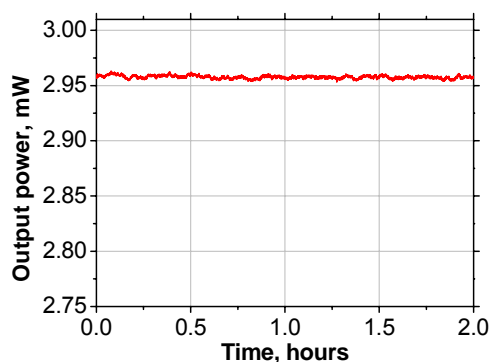


Externally triggered sweeping at 10 Hz

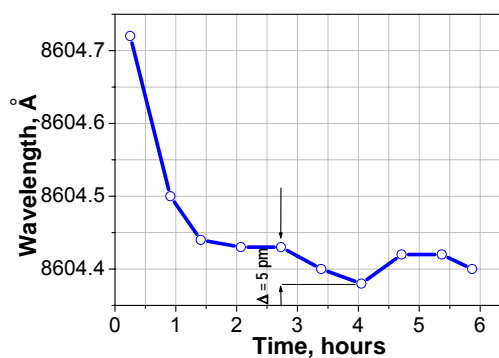
### Single-wavelength operation mode.

Wavelength, nm	Any within the full tuning range
Long-term wavelength stability	< 0.05 nm variation
Wavelength resolution (manual tuning)	0.05 nm

### Examples – single-wavelength operation mode.



Power stability



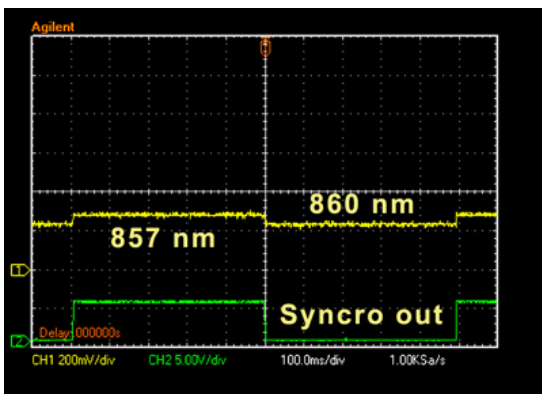
Wavelength stability measurements

**Wavelength alternation mode (alternation of the two desired wavelengths).**

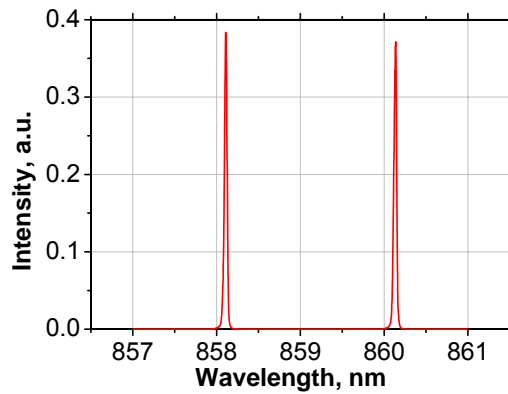
Wavelength $\lambda_1$ , nm	Any within the full tuning range
Wavelength $\lambda_2$ , nm	Any within the full tuning range
Difference between $\lambda_1$ and $\lambda_2$	0.05 nm minimum, 50 nm maximum
Wavelength alternation rate*	0.1 – 1000 Hz
Duty factor	50%

\* Factory-preset values of wavelength alternation rate are as follows:  
0.1, 0.2, 0.5, 1.0, 2.0, 5.0, 10, 20, 50, 100, 200, 500, 1000 Hz.

**Examples – wavelength alternation mode.** Up to a 1-kHz alternation rate is attainable.



Wavelength alternation mode



Time-averaged optical spectrum