Bench Top Tunable Lasers
TSL-210/220

santec

Santec's TSL models are designed as fully-controllable, single-channel benchtop tunable lasers, with superior performance and reasonable cost. Both the TSL-210 and TSL-220 units offer excellent stability in conjunction with high output power and wide wavelength tuning ranges, selectable from various windows between 1260 and 1650 nm (TSL-210). These lasers share many standard features that include Automatic Power Control (APC), fine-tuning wavelength control, fully variable coherence control, and a GPIB-RS232C interface with drivers for LabView™ and Visual Basic™.

The TSL-220 also features an integrated wavelength monitor, which enables the laser to achieve absolute wavelength accuracy of ±5 pm. In addition, a built-in tracking filter is incorporated to cut ASE noise and provide a high signal-to-noise ratio (SNR). A built-in attenuator adjusts optical power to ensure that a high side-mode-suppression ratio (SSR) is maintained even at low output levels.

The TSL-210 and TSL-220 tunable lasers are ideal for use in a wide variety of telecom applications including research, development, and production environments.

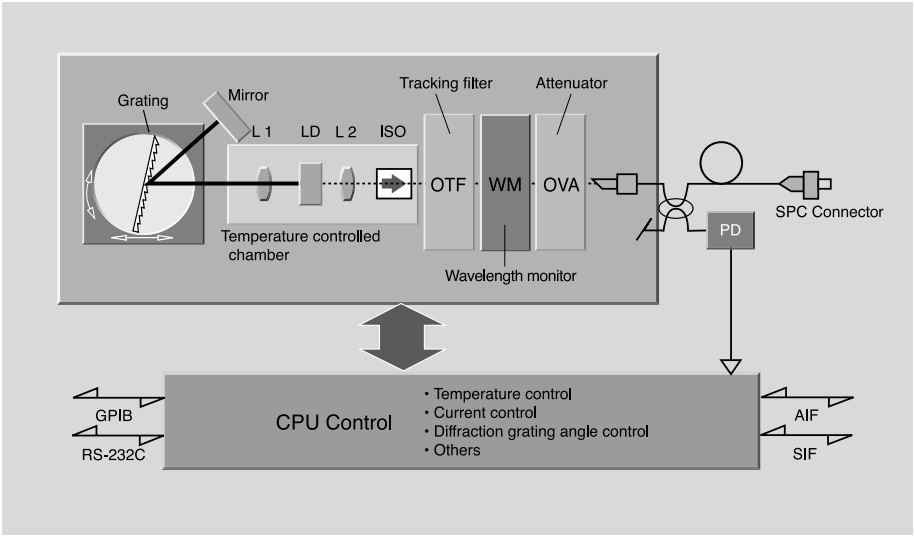


Figure 1: Principle of Operation

Model Comparison

	TSL-210	TSL-220
Peak Power	10mW (typ)	4mW
Tuning Range	>80nm	80nm
Wavelength Accuracy	<±0.1nm	<±0.005nm
Wavelength Monitor	not available	included
Attenuator	optional	included
Tracking Filter	optional	included

CP-10 Control Pad for TSL-210/220

The TSL lasers feature a simple, easy to use front panel interface. The CP-10 offers additional control, providing full support of all functions in a compact handheld unit. Up to 128 combinations of wavelength and power can be stored in the CP-10 memory, and wavelength sweeps can be easily and conveniently performed.

TSL-220

High accuracy, high signal-to-noise

Features

- High wavelength accuracy <±5pm
- 1530-1610nm tuning
- Standard built-in WM, OTF and OVA
- Compact size, & easy operation
- Low cost & short lead time

Output Power

	Normal
Peak	>4mW
40nm	>3mW
80nm	>1mW

* High power is not available.

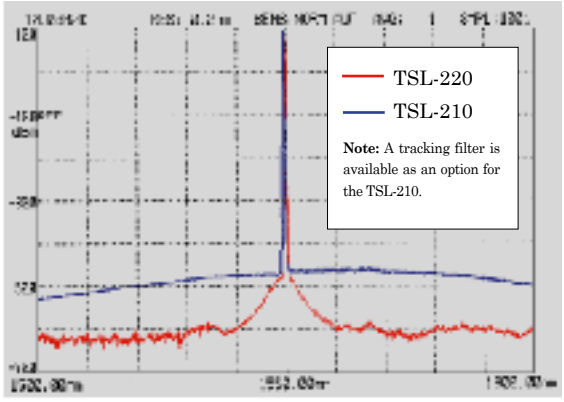


Figure 2: Built in Tracking Filter Characteristics

TSL-210

High power, wide tuning range

Features

- 80-100nm range @1260-1650nm
- High power over 10mW
- High accuracy and stability for wavelength & power
- Compact size, & easy operation
- Low cost & short lead time
- Made in Japan Top quality

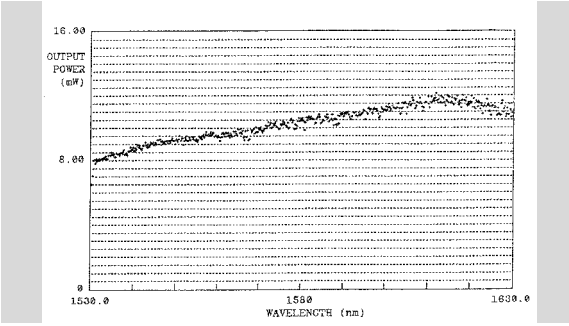
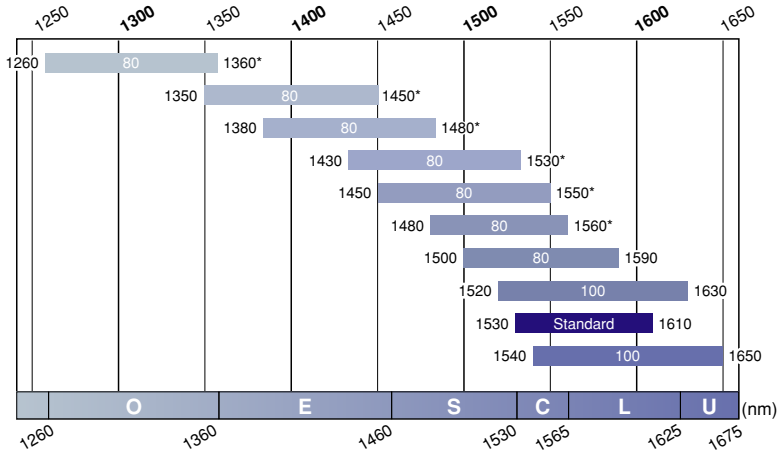


Figure 3: Wavelength vs. Power Characteristics

Wavelength Selection

The TSL-210 offers unparalleled wavelength selection options; any 80-100 nm bandwidth within the range of 1260-1650 nm can be provided. Please refer to the examples in the graph below.



Wavelength	Available Range	High Power Option Type
*1260 - 1360	80nm	B
*1350 - 1450	80nm	B
*1380 - 1480	80nm	B
*1430 - 1530	80nm	B
*1450 - 1550	80nm	B
*1480 - 1560	80nm	A
1500 - 1590	80nm	B
1520 - 1630	100nm	A
1530 - 1610	80nm	A
1540 - 1650	100nm	A

* For certain wavelengths below 1500nm performance may not meet specification due to OH absorption.

Output Power

High power option is available for each wavelength range. With the integrated filter both output power and high power will decrease to 80% of the specification.

A TYPE	Normal	High power option
Peak	>8mW	>10mW
40nm	>6mW	>7mW
80nm	>4mW	>5mW
All(90-100nm)	>3mW	>4mW

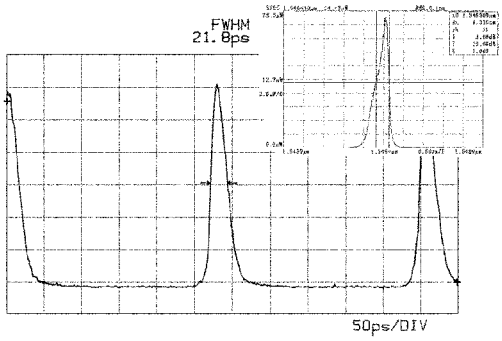
B TYPE	Normal	High power option
Peak	>8mW	>10mW
40nm	>6mW	>7mW
80nm	>2mW*	>3mW

* Typ. >4mW

TSL-210 Pulse

The TSL-210 Pulse produces ultrashort optical pulses using an active modelocking method. Pulses shorter than 30ps, with a repetition rate of 2.5GHz, can be generated over the entire tuning range of >80nm.

Specifications	
Center wavelength	1570nm
Tuning range	80nm
Optical power	3dBm at peak
Repetition rate	2.5±0.1GHz
Pulse width	<30psec
Average power	0.2mW

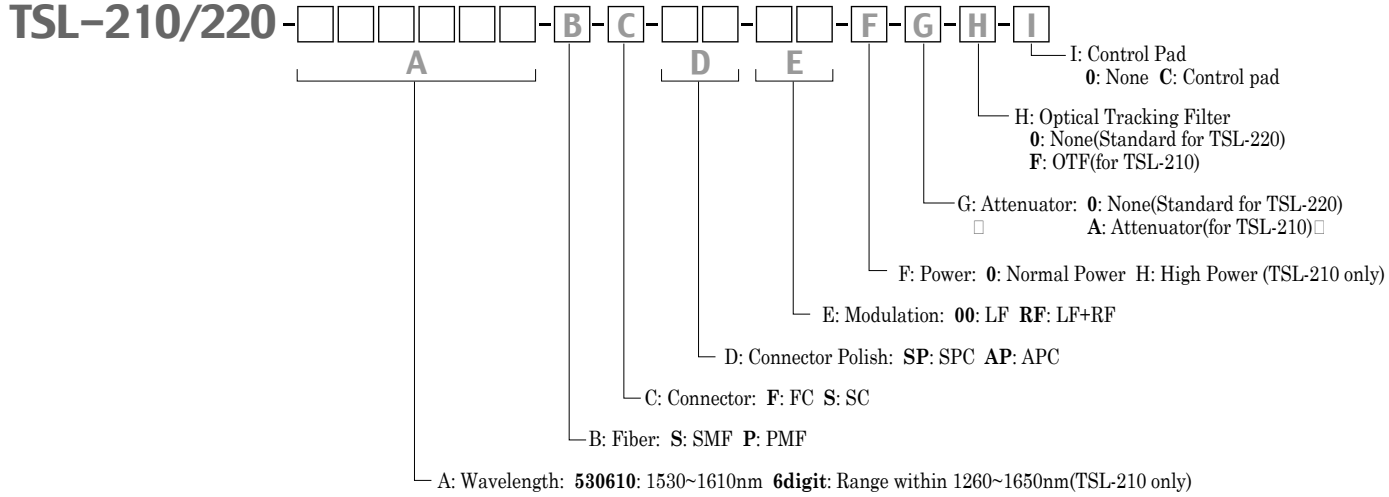


■ Specifications

Category	Parameter	Unit	TSL-210	TSL-220	Notes
Wavelength Characteristics	Tuning Range	nm	-	1530 to 1610	Refer to "TSL-210 Wavelength Selection(210)
	(Maximum tuning width)		-	80	Refer to "TSL-210 Wavelength Selection(210)
	Resolution	nm	0.01	0.001	0.001nm with fine tuning (210)
	Accuracy	nm	<±0.1	<±0.005	
	Repeatability	nm	<±0.05	<±0.005	N=50 /Measured at center wavelength
	Stability	nm	<±0.01		After a warm-up 1h/1hour /Measured at center wavelength
	Fine Tuning Range	GHz	10		≒0.08nm
	Tuning Speed	ms/nm	170		Feedback time <500ms (220)
Power *	Output Power	mW	-	>4 (Peak)	Refer to "TSL-210 Output Power" (210)
	Accuracy	%	<5		
	Repeatability	dB	<±0.01		N=50 /Measured at center wavelength /at 6dBm
	Stability	dB	<±0.01		After a warm-up 1h/1hour /Measured at center wavelength
	APC Flatness	dB	<±0.2		Measured at 6dBm APC:Automatic Power Control
	(Built in Attenuator Option)	dB	0 to 20		Resolution 0.04dB (Typ.)
	(Built in Tracking Filter Option)	dB	20% down		3dB Bandwidth 3nm (Typ.), Resolution 0.24nm (Typ.)
Environmental Conditions	Operating Temp. Range	ºC	20 ~ 30		
	Operating Humidity Range	%	<80		non condensing
	Storage Temp. Range	ºC	10 ~ 40		
	Storage Humidity Range	%	<80		non condensing
	Recommendation Calibration Period	Year	1		
Spectrum	Spectrum Line Width (Coh. OFF)	MHz	<1		Measured at center wavelength
	Spectrum Line Width (Coh. ON)		1 to 500		Variable /Measured at center wavelength
	SSR	dB	>45		Measured at center wavelength
	RIN	dB	>145		Measurement Freq. <1GHz
Interface	Optical Connector	-	FC or SC		
	Optical Fiber	-	SMF or PMF		
	Connector Polish	-	SPC or APC		
	GP-IB & RS-232C	-	Yes		IEEE-488
Modulation	LF modulation	KHz	0 to 10		
	(RF Modulation option)	MHz	1 to 100		at 3dB Down
Power Supply	Voltage	V	AC100-240		
	Power Consumption	VA	35-55		
Dimensions	Width x Height x Depth	mm	210x110x370		
	Weight	kg	6		

* For certain wavelength below 1500nm performance may not meet specification due to OH absorption.

■ Ordering Code



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