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# Bench Top Tunable Lasers
# TSL-210




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Santec's TSL models are designed as fully-controllable, single-channel benchtop tunable lasers, with superior performance and reasonable cost. The TSL-210 unit offers excellent stability in conjunction with high output power and wide wavelength tuning ranges, selectable from various windows between 1260 and 1650 nm. 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-210 tunable laser is ideal for use in a wide variety of telecom applications including research, development, and production environments.

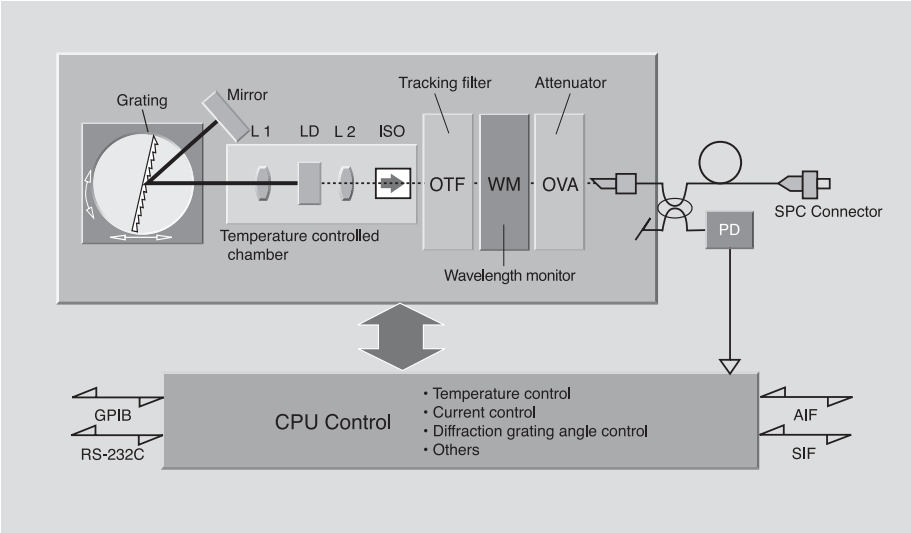



**Figure 1: Principle of Operation**

## 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

## CP-10 Control Pad for TSL-210

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.



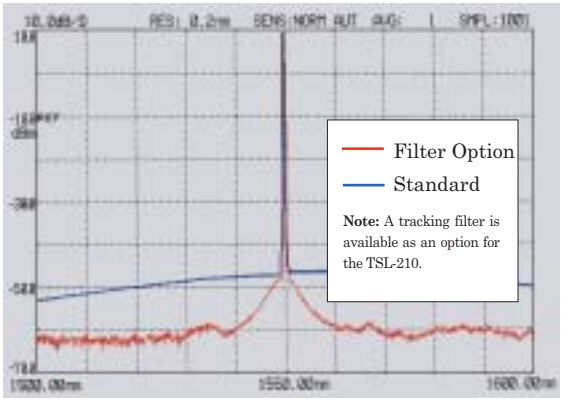



**Figure 2: Built in Tracking Filter Characteristics**

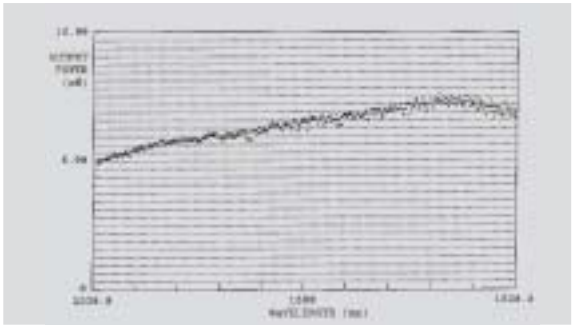
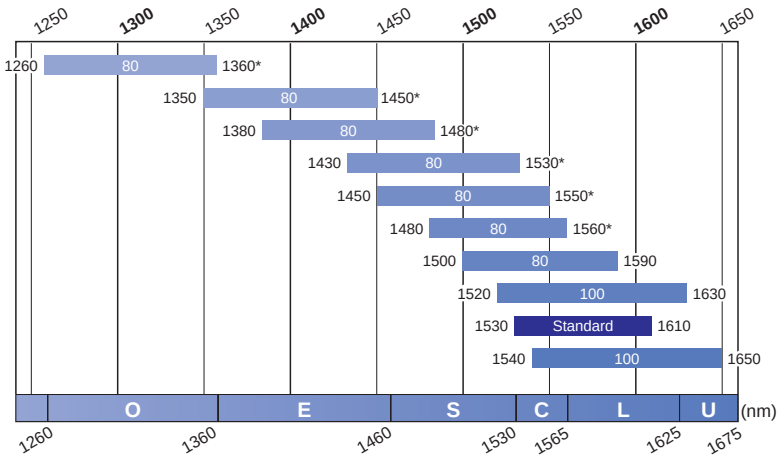


**Figure 3: Wavelength vs. Power Characteristics**

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## 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 | Tuning Range | Output Power 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 wavelength around 1400nm 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 |

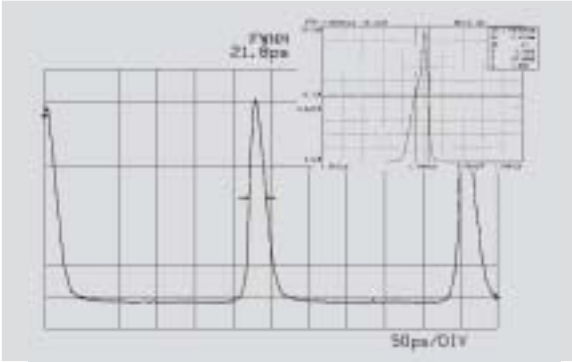
| B TYPE | Normal | High power option |
|---|---|---|
| Peak | >8mW | >10mW |
| 40nm | >6mW | >7mW |
| 80nm | >2mW*[1] | >3mW*[2] |

*[1]Typ. >4mW *[2]Typ. >5mW

# 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 |

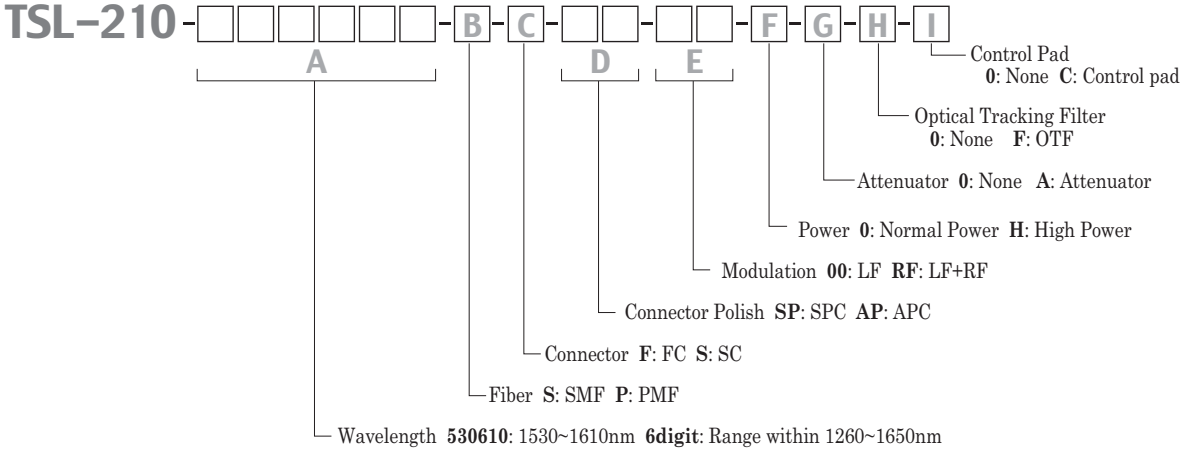


## ■ Specifications

| Category | Parameter | Unit | Specification | Notes |
|---|---|---|---|---|
| Wavelength Characteristics | Tuning Range | nm | - | Refer to "TSL-210 Wavelength Selection |
| | (Maximum tuning width) | | - | Refer to "TSL-210 Wavelength Selection |
| | Resolution | nm | 0.01 | 0.001nm with fine tuning (210) |
| | Accuracy | nm | <±0.1 | |
| | Repeatability | nm | <±0.05 | 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 | |
| Power * | Output Power | mW | - | Refer to "TSL-210 Output Power" |
| | 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 wavelength around 1400nm performance may not meet specification due to OH absorption.

## ■ Ordering Code





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