



## INTELLIGENT TUNABLE LASER DIODE SOURCE (PATENT: USA 7067993)

### Features:

- User tunable wavelength
- User controllable power level
- Excellent power and wavelength stability over wide operating temperature
- Very short warm-up time
- Serial port for computer control
- Small size, low cost

### Applications:

- DWDM network testing
- Component testing
- Instrument wavelength and power calibration
- General lab use

**PRELIMINARY  
DATA SHEET**

### Product Description:

The Tunable Laser Diode Source from OZ Optics is a compact optical source providing a user controllable wavelength and output power level. Using a unique temperature compensation system, the source is able to provide excellent stability in both wavelength and power. Unlike many sources that are accurate at only the calibration temperature, OZ Optics' tunable laser is designed to maintain high accuracy over a wide range of ambient temperatures. This makes it an ideal source for use in environments where the room temperature is not precisely controlled.

Unlike conventional sources that may require half an hour to warm up, the unique design of this source allows the device to achieve stable operation within seconds of being turned on. This saves time and effort for technicians in the field or on the production floor.

In DWDM applications, precise wavelength control is essential for obtaining accurate test measurements. With wavelength accuracy at the picometer level, the OZ tunable source is able to meet these demanding requirements. While the operating wavelength of most laser diodes is dependent on the current through the laser, the design of OZ Optics' tunable laser will automatically compensate for changes in output power to restore the wavelength to its desired value.

DWDM applications for the metro marketplace require lasers operating at precise wavelengths in order to ensure that light intended for one channel does not interfere with adjacent channels. The precise wavelength control of the Intelligent Tunable Laser Diode Source allows one to replace an array of specific-wavelength sources with a single tunable source. By tuning the source, one can set the source to the specific channel required. OZ Optics also makes banks of 4 to 8 tunable laser modules for OEM applications. Each laser in a bank can be individually tuned to cover any of up to 10 channels (at 50 GHz spacing).

Not only does the Tunable Source offer accurate wavelength control, it also provides excellent power level control and stability. Power level accuracy is better than 1%, over a wide range of temperatures and wavelengths, with stability of better than 0.01 dB. With specifications like these, the Intelligent Tunable Laser Diode Source is well suited to countless applications where stability, accuracy, and reliability are required.

For more information on tunable laser diode products, contact OZ Optics.



**Tunable Laser Diode Source**

**Ordering Information For Standard Parts:**

Bar Code	Part Number	Description
20405	TL-100-3A-1550-2-1-D	Intelligent Tunable Laser Diode Source with angled FC/APC connector, 1550nm center wavelength, $\pm 2$ nm tuning range using a DFB laser, with 1 mW output power. Universal 110/220 volt AC/DC adapter with removable North American power cord included. (Other power cords are available separately. See below.)
4572	GPIB-RS232	RS232 to GPIB Adapter
4571	GPIB-CABLE-2	GPIB Cable, 2m long.
2736	POWER CORD - UK	POWER CORD for UK
2737	POWER CORD - EUROPE	POWER CORD for Europe
8122	SMJ-3A3A-1300/1550-9/125-3-1	1 meter long, 3mm OD jacketed, 1300/1550nm 9/125 SM fiber patchcord, terminated with angled FC/PC connectors on both ends.

**Standard Product Specifications:**

Center Wavelength	1550	nm
Wavelength Tuning Range	$\pm 2$	nm
Wavelength Accuracy	$\pm 0.004$	nm
Wavelength Resolution	0.001	nm
Wavelength Response Time	30 (typical)	Seconds, from minimum wavelength to maximum wavelength.
Output Power	1	mW
Power Dynamic Range	20	dB
Power Stability	$\pm 0.005$	dB
Power Accuracy	5	%
Power Resolution	0.001	dB
Power Response Time	2 (typical)	Seconds, from minimum specified power to maximum specified power.
Connector	Angled FC/APC	
Remote Communications Interface	RS232	
Power Requirements	120 to 240(@50 - 60 Hz)	Volts. Universal AC/DC adaptor included.
Operating Temperature Range	15 to 35	$^{\circ}\text{C}$
Storage Temperature Range	-30 to 60	$^{\circ}\text{C}$
Warm up time	30 15	Seconds. Limited by slew rate of wavelength. Seconds to stable power. Limited by boot-up time
Dimensions	60 x 90 x 190	mm, including protective boot.
Weight	0.5	kg
Storage Humidity	<90%	RH, non-condensing

### Ordering Information For Standard Parts:

A customer in Europe wants to use a tunable laser in order to test the spectral characteristics of DWDM optical components at different wavelengths around 1550 nm. His test jig has an angled FC/PC connector. The power level must be adjustable over the range of 50 microwatts to 1 milliwatt. The customer would like to be able to use a tunable source directly, or operate it under computer control for automated testing.

The standard Intelligent Tunable Laser Diode Source offered by OZ Optics will fulfill the requirements. In addition, the customer should order a power cord for use in Europe. He may also wish to order a patchcord to connect the source to his test jig. The complete list of parts that he would order is shown below:

Bar Code	Part Number	Description
20405	TL-100-3A-1550-2-1-D	Intelligent Tunable Laser Diode Source with angled FC/APC connector, 1550nm center wavelength, $\pm 2$ nm tuning range using a DFB laser, with 1 mW output power. Universal 110/220 volt AC/DC adapter with removable North American power cord included.
2737	POWER CORD - EUROPE	POWER CORD for EUROPE
8122	SMJ-3A3A-1300/1550-9/125-3-1	1 meter long, 3mm OD jacketed, 1300/1550nm 9/125 SM fiber patchcord, terminated with angled FC/PC connectors on both ends.

### Questionnaire For Custom Parts:

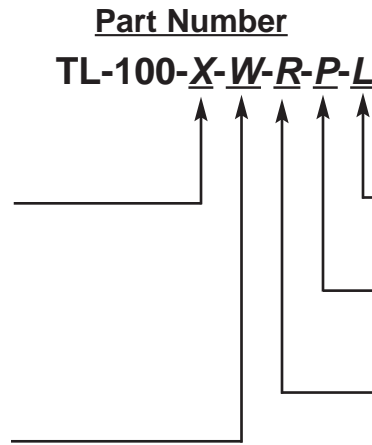
1. What is the desired center wavelength?
2. What is the required tuning range?
3. What is the maximum power required?
4. What is the minimum power that you require?
5. What type of optical receptacle do you need on the source?
6. What type of laser diode do you need?

### Ordering Information for Custom Parts:

#### Description

Intelligent Tunable Laser Diode Source

<b>X:</b>	Output Connector Codes: 3S=Super or Ultra NTT-FC/PC 3A=Angled NTT-FC/PC 8=AT&T-ST SC=SC SCA=Angled SC LC=LC LCA=Angled LC
<b>W:</b>	Center Wavelength in nanometers: (Example: 1550 for 1550 nm)



<b>L</b>	Type of Laser Diode: F=Fabry-Perot D=DFB (Distributed Feedback) (Recommended)
<b>P</b>	Maximum Optical Power in milliwatts: (Example: 10 for 10 milliwatts.)
<b>R</b>	Tuning Range in nanometers from the center wavelength: (Example: 1 for $\pm 1$ nm range.)

### Ordering Examples for Custom Parts

A customer in North America needs to test the wavelength sensitivity of some DWDM components over the range of 1532 nm to 1536 nm, at a power level in the range of 500 microwatts to 5 milliwatts. He requires an angled FC connector on his source. He can meet these requirements with the following:

Part Number	Description
TL-100-3A-1534-2-5-D	Tunable Laser Diode Source with angled FC/APC connector, 1534 center wavelength, $\pm 2$ nm tuning range, with 5 mW output power. Universal 110/220 volt AC/DC adapter with removable North American power cord included.

## Frequently Asked Questions (FAQs)

**Q:** What is the difference between a Fabry-Perot laser and a DFB laser?

**A:** A Fabry-Perot laser may have multiple peaks in its spectrum, close to its center wavelength. When operated at low powers, some of these peaks may be comparable in amplitude to the central peak. These are related to mode hopping, in which the dominant peak jumps from one wavelength to another. At higher power levels, these peaks generally disappear. DFB lasers have a single, well defined peak throughout their operating range. Since there are fewer problems associated with DFB lasers, they are generally preferred over Fabry-Perot lasers when mode hopping or spectral purity is important. However, DFB lasers are somewhat more expensive than Fabry-Perot lasers.

**Q:** What type of connector should I use for best results?

**A:** OZ Optics generally recommends the use of angled connectors. Connectors with flat surfaces tend to reflect more light back towards the laser, which can lead to optical instability within the laser. Although the tunable lasers have built-in optical isolators to reduce the effects of backreflection, best results are obtained when the reflected light is minimized.

**Q:** What makes the OZ Optics tunable source better than other sources?

**A:** Most optical sources are calibrated at one specific temperature. Although they may have built-in temperature compensation circuitry, such compensation generally works best for temperatures close to the calibration temperature. The OZ optics devices are fully calibrated at many different operating temperatures and power levels so as to ensure the utmost in accuracy over a very wide temperature span.

**Q:** Doesn't the wavelength change if you change the output power of the laser diode?

**A:** Normally, the wavelength of a laser diode will change slightly if the current through the diode changes significantly. The novel control techniques that OZ Optics uses in its Tunable Laser Diode Source allow it to compensate for changes to the wavelength that would otherwise occur when the current through the laser diode is altered.