Laser Spectrum Analyzer

TL Series

Most precise laser spectral analysis available

- High spectral resolution with finesse greater than 150
- Variable free spectral range for optimum performance with virtually any laser
- Interchangeable mirrors for operation from 450 nm to 3.5 µm
- Automatic spectral analysis with optional NuView software
- System comes complete with everything necessary
- Programable ramp generator to maximize measurement precision
- Optional fiber-optic coupling

The power of precision in laser spectral analysis

EXFO

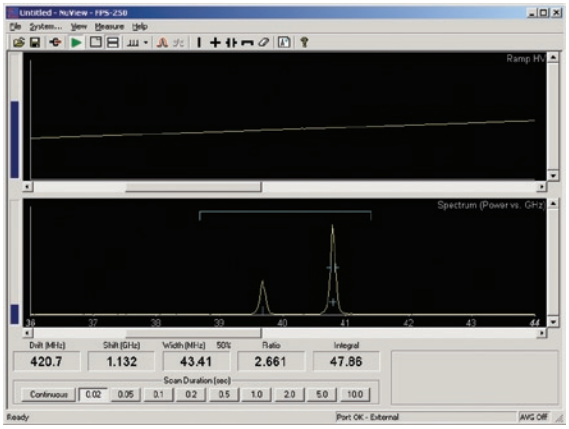
High-Performance Analysis of a Variety of Lasers

EXFO's TL Series laser spectrum analyzer provides the most convenient spectral characterization of lasers with large bandwidths or range of frequencies. With a free spectral range of 15 to 1500 GHz, the TL Series easily measures the spectral features of virtually any CW laser operating at wavelengths from 450 nm to 3.5 µm. With a finesse greater than 150, the TL system provides the highest spectral resolution available.

Variable Free Spectral Range

The TL Series laser spectrum analyzer utilizes a piezoelectrically scanned, plano-mirror Fabry-Perot interferometer to provide the free spectral range required for the analysis of broadband lasers. Unlike confocal mirror laser spectrum analyzers that have a fixed free spectral range that is typically less than 10 GHz, the TL Series has a discretely variable free spectral range that is as large as 1500 GHz. This provides the capability of optimizing the free spectral range with respect to virtually any laser to maximize resolution without overlapping interference orders.

The mirrors of the TL Series laser spectrum analyzer are separated by a thermally stable Invar spacer, the thickness of which determines the system's free spectral range. Standard Invar spacers with different thicknesses are available, allowing seven options for free spectral range between 15 and 1500 GHz. You simply choose the model with the free spectral range that is appropriate for your application. The optional TL-150 Invar spacer set lets you change the free spectral range of the system to any of the available choices.



NuView spectrum display shows the spectral characteristics of a HeNe laser.

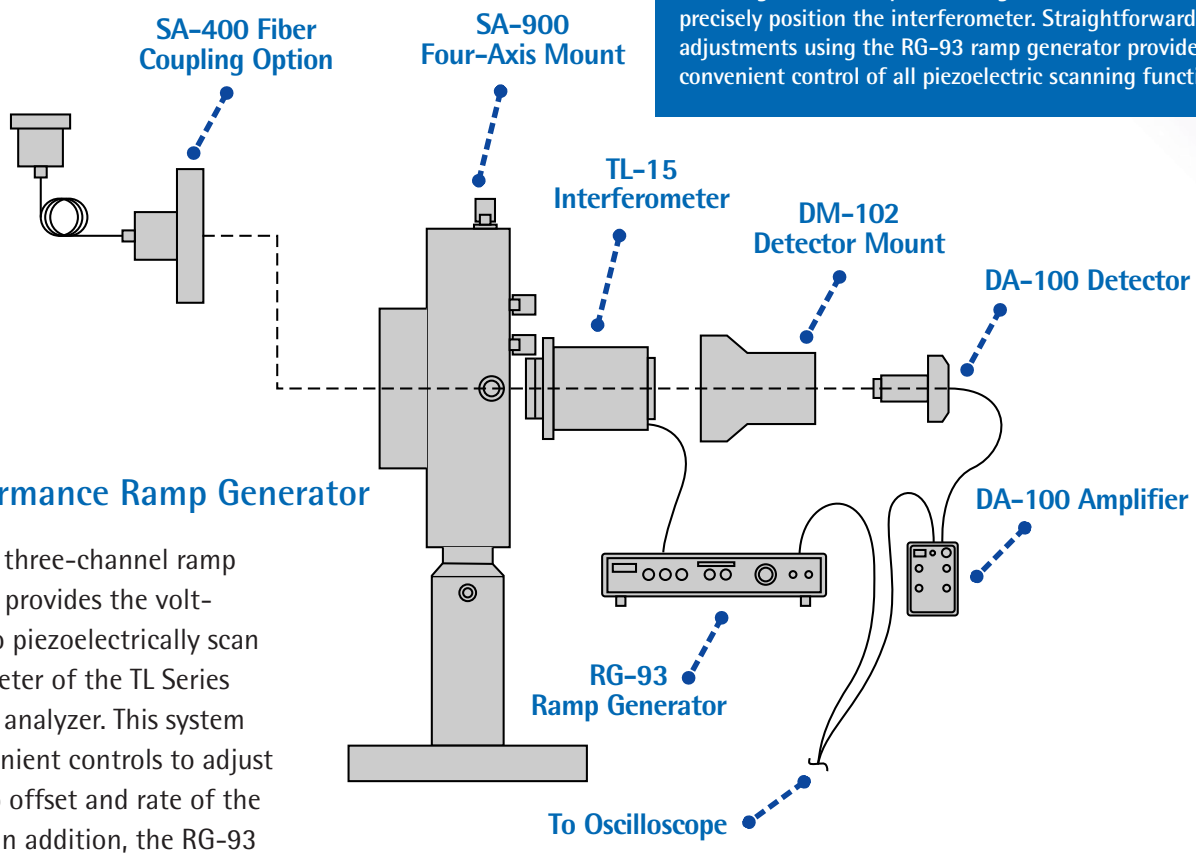
Operates from 450 nm to 3.5 µm

The TL Series laser spectrum analyzer offers the flexibility of interchangeable mirrors for operation anywhere from 450 nm to 3.5 µm. To achieve a finesse of greater than 150, the mirrors have a multilayer dielectric coating with a nominal reflectivity of 99.3% over a customized wavelength range. A standard wavelength range from 1.28 to 1.58 µm is available to work with lasers used for optical fiber communications.

Laser Spectral Analysis Made Easy

EXFO not only provides the highest performance laser spectrum analyzers, but it also makes laser spectral analysis easy. The TL Series laser spectrum analyzer includes all the components necessary for routine operation with virtually any CW laser. Alignment of the laser under test is simple using a four-axis mount (X-Y-Θ-Φ to precisely position the interferometer. All that's left to do is connect your oscilloscope to view the output.

With TL Series laser spectrum analyzers, alignment of the incoming beam is simplified using a four-axis mount to precisely position the interferometer. Straightforward adjustments using the RG-93 ramp generator provide convenient control of all piezoelectric scanning functions.



High-Performance Ramp Generator

The RG-93 is a three-channel ramp generator that provides the voltage required to piezoelectrically scan the interferometer of the TL Series laser spectrum analyzer. This system provides convenient controls to adjust the range, zero offset and rate of the ramp voltage. In addition, the RG-93 provides three independent DC bias signals for fine control of the alignment of the plano mirrors. The slope of the ramp for the three output channels can also be adjusted independently to ensure tilt-free scanning. The RG-93 ramp generator also includes an adjustment to shape the ramp voltage in such a way as to correct for the inherent non-linear motion of the piezoelectric transducer. External input also can be accepted for custom control of the interferometer in special applications.

High-Sensitivity Detector/Amplifier

The DA-100 detector/amplifier detects the laser light transmitted through the interferometer of the TL system, and then amplifies the signal for display.

The photodetector is interchangeable for operation with the visible to the infrared wavelength ranges. Its superior low noise performance detects signals as low as 1 nW in order to minimize the laser intensity required for laser spectral analysis. Convenient packaging and self-explanatory controls result in straightforward operation.

Optional Fiber-Optic Coupling

The TL Series laser spectrum analyzer can be enhanced further with fiber-optic input that simplifies the coupling of the laser under test into the interferometer.

Specifications

TL Series Interferometer

Cavity design	Plano mirror geometry
Free Spectral Range (FSR)	2 GHz or 8 GHz
Finesse	> 150
Minimum resolvable bandwidth	FSR/Finesse
Wavelength range	Custom ranges from 450 nm to 3.5 µm
Mirror reflectivity	99.3% nominal
Transmission	> 10%
Input aperture	1 mm
PZT scan distance	2 µm/1000 V or 6 µm/1000 V (IR version)
PZT non-linearity	< 1% or < 5% (IR version)
Scan non-linearity[1]	< 0.1% or < 0.5% (IR version)
Construction	Thermally compensated re-entrant design

RG-93 Ramp Generator

Ramp voltage	
Amplitude	0 to 1000 V (continuously variable)
Bias	0 to 1000 V (continuously variable)
High voltage output	Amplitude + bias (1000 V maximum)
Current	4 mA maximum
RMS noise	< 30 mV
Duration	20 ms to 10 s (switch selectable)
Output slew rate	1 V/ms
Retrace	20 ms duration
External input	0 to 10 V (gain variable from 0 to 100)
Ramp non-linearity	≤ 0.25% (10 - 90%)
Slope trim	0 to 15% slope reduction
Independent PZT Bias	
Voltage	0 to 525 VDC per channel
Output currant	2 mA maximum per channel
RMS Noise	< 30 mV
Output signals	
Blanking	0 V during ramp, -10 V during retrace
Output ÷ 100	0 to 10 V
Dimensions and weight	
Dimensions (H x W x D)	11.4 cm x 43.3 cm x 34.3 cm (4.5" x 17.0" x 13.5")
Weight	3.6 kg (8 lbs)
Power requirements	90 to 260 VAC, 50/60 Hz

DA-100 Detector Amplifier

Bandwidth	0.3 to 100 kHz (0.3 to 20 kHz @ maximum gain)
Sensitivity	0.1 V/mW to 1 V/µW, continuously variable
Minimum detectable power	Silicon - 1 nW @ 633 nm, Germanium - 2 nW @1.5 µm, Lead Selenide - 0.2 µW @ 2.4 µm
RMS noise	< 1 mV
Offset adjust	± 1 V
Output signal	0 to ± 6 V, 200 Ω impedance (polarity is invertible)
Dimensions and weight	
Dimensions (H x W x D)	5.7 cm x 8.9 cm x 15.2 cm (2.25" x 3.5" x 6.0")
Weight	0.45 kg (1 lb)
Power requirements	9 V battery

TL Accessories Available

TL-150	Invar Spacer Set
SA-610	Fiber-Optic Coupler
BC-1	Free Space to Fiber Coupler
FC-	Fiber Patch Cord

How to Order

Laser Spectrum Analyzer

TL - 0000S - 000 - 00

Choose: Free Spectral Range	**Choose:** Wavelength Designation *(Bandwidth)*	**Specify:** Center Wavelength
1500: 1500 GHz	VIS: 450 - 900 nm *(100nm)*	
0750: 750 GHz	NIR: 900 - 1800 nm *(150 nm)*	
0300: 300 GHz	IR: 1.8-3.5 µm *(300nm)*	
0150: 150 GHz	FT: 1.28 - 1.58 µm *(not applicable)*	
0075: 75 GHz		
0030: 30 GHz		
0015: 15 GHz		

Mirror Set

TL-115 - 00099 - 00

To discuss how the TL Series Laser Spectrum Analyzer will facilitate your laser spectral analysis, contact the experts at EXFO Burleigh Products Group: **1-585-924-9355** or **info@burleigh.com**

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