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# TUNABLE LASER SOURCE
# MG9637A/9638A

**1500 to 1580 nm**

***For Evaluation of WDM, Optical Devices and Optical Fiber Amplifiers***



GPIB

The larger transmission capacity required by multimedia applications has seen increasing use of wavelength division multiplexing (WDM) using optical fiber amplifiers in every field from R&D to commercial operation. As a consequence, key WDM optical devices such as optical fiber amplifiers, couplers, and isolators require even higher performance and stability.

The MG9637A/9638A design meets these requirements through excellent wavelength repeatability, achieved by self-calibration and improved reliability using a new external cavity technology. The MG9637A/9638A utilize an external optical automatic power control (APC) module, the MG9637A has an Lithium Niobate modulator in the APC section to provide excellent output power stability and S/N ratio. The MG9638A uses a semiconductor amplifier providing a high-power output of at least +4 dBm.

Both laser sources are ideal for evaluating the wavelength loss characteristics and polarization mode dispersion (PMD) of optical devices (couplers, filters, etc.), as well as the gain and noise figure of optical fiber amplifiers and PMD used in dense wavelength division multiplexing (DWDM) systems.

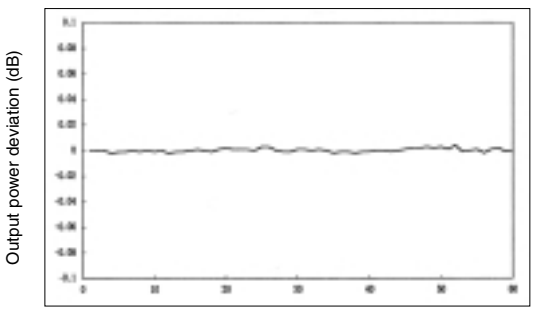
## Features

- Single moded emission
- 1 pm wavelength setting resolution
- ±7 pm max. wavelength repeatability
- +4 dBm or more output
- Two output ports

## Performance

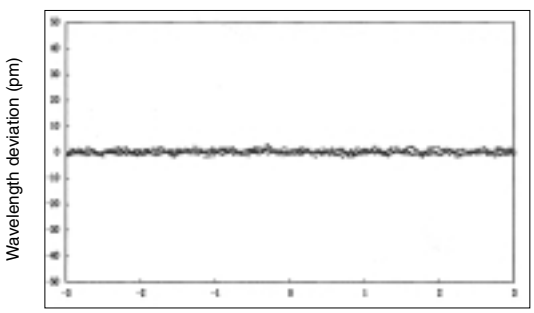
- **Stable output power**

The power of Output 1 of the MG9637A has been stabilized to ±0.01 dB using the APC function, permitting easy and stable wavelength loss measurement of optical devices. In addition, the wavelength flatness is within ±0.1 dB, enabling high-accuracy measurement of wavelength loss without normalization of the output power of the laser source.




- **Wavelength repeatability**

The wavelength repeatability is about ±5 pm when the calibration function (applications for patent) is used. Consequently, the full width half maximum (FWHM) and stop-band loss characteristics of narrow band filters can be measured with high accuracy.




*For product ordering information, see pages 4-7.*

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**• Polarization maintaining fiber output**
Output 1 uses a polarization-maintaining fiber to guarantee a polarization extinction ratio of more than 18 dB at the output side. This is very useful for measuring the polarization characteristics of optical fiber amplifiers and external modulators, as well as for measurement at a constant polarization.

**• Coherence control function**
When measuring the wavelength loss characteristics of an optical devices with a narrow linewidth, interference due to reflect from the optical device reduces the level stability and causes ripple over wavelength. The coherence control function broaders the linewidth to about 50 MHz eliminating level fluctuations due to interference and permitting accurate measurement.

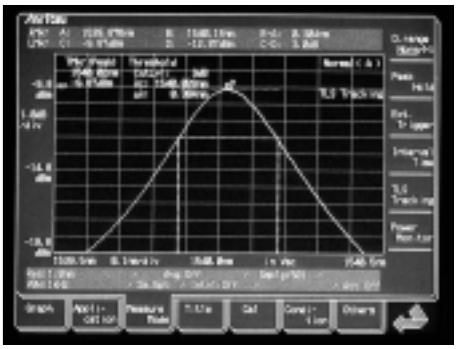
## Functions

**• Fast measurement of narrow-band filters**
DWDM communications currently being commercialized use wavelength multiplexing at an interval of 0.2 nm to several nm. As a consequence, wavelength band pass filters for these applications require a narrow bandwidth and large loss in stop-band loss.

The MG9637A/9638A achieve improved wavelength repeatability and high-speed sweeping using self calibration function (applications for patent). When combined with the MS9710B Optical Spectrum Analyzer or ML9001A Optical Power Meter, wavelength loss characteristics can be measured quickly with high accuracy and a wide dynamic range. For example, high-speed measurement (51 points) is possible in less than 30 seconds.

**• Wide dynamic range measurement with optical spectrum analyzer**
The MG9637A/9638A can be linked with the MS9710B Optical Spectrum Analyzer just by an RS-232C cable, with no need for an external controller. Measurement is made simple by using the MS9710B soft keys. Furthermore, measurement results including transmission loss, FWHM, and stop-band loss characteristics can be analyzed easily using the MS9710B marker, trace, and smoothing functions.

The following screens (A, B) show examples of measurements of a high performance filter with a center wavelength of 1540 nm. Screen A is a FWHM measurement example: since the wavelength repeatability is within ±7 pm, the FWHM can be measured accurately. Screen B shows a pass-band and stop-band loss characteristics measurement example: wide dynamic range measurement of better than 70 dB is possible by setting the MS9710B resolution bandwidth to 0.2 nm.



**A: FWHM measurement (MS9710B display)**



**B: Wide dynamic range measurement (MS9710B display)**

## Specifications

| Model | | MG9637A | MG9638A |
|---|---|---|---|
| Wavelength range | | 1500 to 1580 nm | |
| Wavelength setting resolution | | 1 pm | |
| Absolute wavelength accuracy | | <±0.1 nm | |
| Wavelength stability | | <±100 MHz/h*1 | |
| Wavelength repeatability | | ±35 pm (80 nm range), Typical: ±7 pm (at ±3 nm, after calibration) | |
| Side mode suppression ratio*2 | | >45 dB (1520 to 1570 nm)<br>>40 dB (1500 to 1580 nm) | >40 dB (1520 to 1570 nm)<br>>35 dB (1500 to 1580 nm) |
| Linewidth (typical value) | | 700 kHz (coherent control: Off), 50 MHz (coherent control: On) | |
| Wavelength switching time (typical value) | | 100 ms/1 nm, 150 ms/10 nm, 500 ms/80 nm | |
| Output 1 | Max. output power | >−10 dBm (1520 to 1570 nm)<br>>−13 dBm (1500 to 1580 nm) | >+4 dBm (1520 to 1570 nm)<br>>0 dBm (1510 to 1580 nm)<br>>−5 dBm (1500 to 1580 nm) |
| | Min. setting output power | <−20 dBm | <−10 dBm |
| | Power stability*1 | <±0.01 dB/h | <±0.02 dB/h |
| | Power flatness*3 | <±0.1 dB | <±0.2 dB |
| | Polarization extinction ratio | >18 dB | |
| Output 2 | | Output power: >−10 dBm | |
| Internal modulation | | 200 Hz to 20 kHz (square waveform), Duty: 50% | |
| External modulation*4 | | 1 MHz to 3 GHz | 1 to 300 MHz |
| Interface | | GPIB, RS-232C | |
| Main functions | | Wavelength calibration, single-step sweep | |
| I/O Connector | | Frequency control input, external modulation input, sweep signal output, sweep trigger signal output, internal modulation sync signal output | |

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| | |
|---|---|
| Warm-up time | <1 h |
| Laser safety | FDA21-CFR: Class 1<br>IEC-825: Class 3A |
| Ambient temperature | Operation: +10˚ to +35˚C, Storage: –20˚ to +60˚C |
| Dimensions and mass | 319 (W) x 177 (H) x 450 (D) mm, ≤16 kg |
| Power supply | AC 85 to 132/170 to 250 Vac, <190 VA |
| EMC | EN55011: 1991, Group 1, Class A<br>EN50082-1: 1992 |
| Safety | EN61010-1: 1993 (installation Category II, Pollution Degree II) |

Note: Typical values are not guaranteed.
⋆1: 1 hour at constant temperature
⋆2: Ratio of peak levels over the peak wavelength range ±0.5 to ±2.5 nm, measured using an optical spectrum analyzer with a wavelength resolution of 0.1 nm.
⋆3: Room temperature
⋆4: 10 dB down from the reference point at 10 MHz

## Ordering information

Please specify model/order number, name, and quantity when ordering.

| Model/Order No. | Name | |
|---|---|---|
| | **Main frame** | |
| MG9637A | Tunable Laser Source | |
| MG9638A | Tunable Laser Source | |
| | **Standard accessories** | |
| | Optical connector adapter*1: | 2 pcs |
| J0017 | Power cord, 2.5 m: | 1 pc |
| F0013 | Fuse, 5 A: | 2 pcs |
| S0001 | Optical output control key: | 2 pcs |
| W1213AE | MG9637A/9638A operation manual: | 1 copy |
| W1214AE | Remote control operation manual: | 1 copy |
| B0329G | Front cover: | 1 pc |
| | **Options** | |
| MG9637A-27 | E2000 connector*2 | |
| MG9637A-31 | EC (Radial) connector*2 | |
| MG9637A-37 | FC-PC connector*2 | |
| MG9637A-38 | ST connector*3 | |
| MG9637A-39 | DIN connector*3 | |
| MG9637A-40 | SC connector*3 | |
| MG9637A-43 | HMS-10/A (Diamond) connector*3 | |
| MG9638A-27 | E2000 connector*2 | |
| MG9638A-31 | EC (Radial) connector*2 | |
| MG9638A-37 | FC-PC connector*2 | |
| MG9638A-38 | ST connector*3 | |
| MG9638A-39 | DIN connector*3 | |
| MG9638A-40 | SC connector*3 | |
| MG9638A-43 | HMS-10/A (Diamond) connector*3 | |
| | **Peripheral instruments** | |
| MS9710B | Optical Spectrum Analyzer | |
| ML9001A | Optical Power Meter | |
| MA9611A | Optical Sensor (for ML9001A) | |
| MA9714B | Optical Sensor (for ML9001A) | |
| MN9610B | Programmable Optical Attenuator | |
| MN9611B | Programmable Optical Attenuator | |
| MF9630A | Optical Wavelength/Frequency Counter | |
| | **Application parts** | |
| J0654A | RS-232C cable, 9P-9P | |
| J0655A | RS-232C cable, 9P-25P | |
| J0007 | GPIB cable, 1 m | |
| J0617B | Replaceable optical connector (FC) | |
| J0618D | Replaceable optical connector (ST)*4 | |
| J0618E | Replaceable optical connector (DIN) | |
| J0618F | Replaceable optical connector (Diamond HMS-10/A) | |
| J0619B | Replaceable optical connector (SC)*4 | |
| J0635B | FC • PC-FC • PC-2M-SM (FC • PC optical fiber cord, 2 m, SM) | |
| Z0282 | Ferrule cleaner | |
| Z0283 | Replacement reel for ferrule cleaner (6 pcs/set, for Z0282) | |
| Z0284 | Cleaner for optical adapter (stick type, 200 pcs/set) | |
| B0335C | Hard carrying case | |

⋆1: Any of the listed connector options can be fitted as standards if specified when placing the order. If no connector types is specified in the order, FC-PC connectors (MG9637A/9638A-37) will be fitted.
⋆2: Factory option
⋆3: User-replaceable type
⋆4: The optical output off function is not available when no optical fiber cord is connected to the ST or SC replaceable optical connector.

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