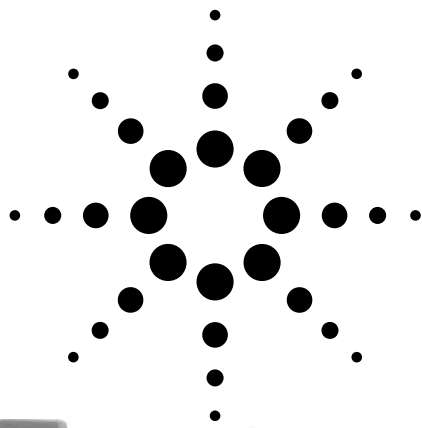
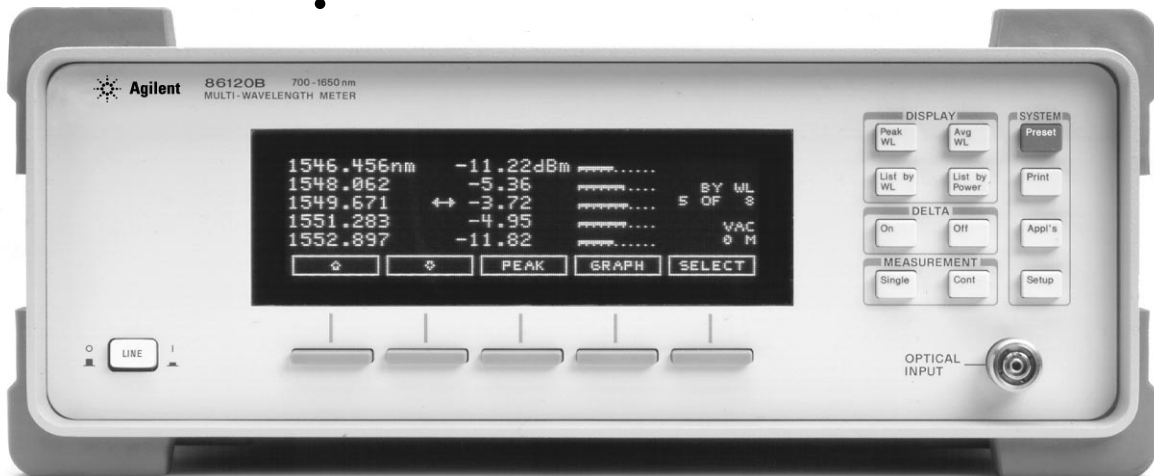




# Agilent 86120B Multi-Wavelength Meter Technical Specifications



The Agilent 86120B Multi-Wavelength Meter is a Michelson interferometer-based instrument that measures wavelength and optical power of laser light in the 700 to 1650 nm wavelength range. Simultaneous measurements of multiple laser lines are performed allowing measurements of WDM (wavelength division multiplexed) signals and multiple lines of Fabry-Perot lasers. Each laser line is assumed to have a linewidth of less than 10 GHz.

This technical specifications sheet describes the measurement accuracy and operating condition of the Agilent 86120B Multi-Wavelength Meter. The **specifications** apply to all functions over the temperature range 0 to 55°C and relative humidity <95% (unless otherwise noted). All specifications apply after the instrument's temperature has been stabilized after 15 minutes continuous operation, and when the instrument is in NORMAL UPDATE mode unless noted.

## Wavelength

### Range

700 to 1650 nm (182 to 428 THz)

**Absolute accuracy**, laser lines separated by >30 GHz

±3 ppm (±0.005 nm at 1550 nm, ±0.004 nm at 1310 nm)

**Differential accuracy**<sup>1</sup>

±2 ppm

**Minimum resolvable separation**<sup>1,2</sup>

(equal power lines input)

20 GHz (0.16 nm at 1550 nm, 0.11 nm at 1300 nm)

**Display resolution**

0.001 nm, normal update mode

0.01 nm, fast update mode

## Power

### Calibration accuracy

±0.5 dB (at ±30 nm from 780, 1310, and 1550 nm)

**Flatness**, 30 nm from any wavelength

1200 to 1600 nm<sup>1</sup>

±0.2 dB

700 to 1650 nm<sup>1</sup>

±0.5 dB

**Linearity**<sup>3</sup>

±0.3 dB

**Polarization dependence**,

1200 to 1600 nm

±0.5 dB

700 to 1650 nm<sup>1</sup>

±1.0 dB

**Display resolution**

0.01 dB

<sup>1</sup>Characteristic

<sup>2</sup>For lines separated by less than 30 GHz, wavelength accuracy is reduced.

<sup>3</sup>1200 to 1600 nm, lines above -30 dBm



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## Definition of Terms

### Characteristics and Specifications

The distinction between specifications and characteristics is described as follows:

- *Specifications* describe warranted performance.
- *Characteristics* provide useful, but nonwarranted information about the functions and performance of the instrument.

### Wavelength

- *Range* refers to the allowable wavelength range of the optical input signal.
- *Absolute accuracy* indicates the maximum wavelength error over the allowed environmental conditions.
- *Differential accuracy* indicates the maximum wavelength error in measuring the wavelength difference between two signals that are simultaneously present.
- *Minimum resolvable separation* indicates the minimum wavelength separation of two laser lines input required to measure each wavelength simultaneously. Two laser lines closer in wavelength than the minimum resolvable separation are not resolved and one average wavelength is displayed.
- *Display resolution* indicates the minimum incremental change in displayed wavelength.

### Power

- *Calibration accuracy* indicates the maximum power calibration error at the specified wavelengths over the allowed environmental conditions.
- *Flatness* refers to the maximum amplitude error in a measurement between two lines that are separated in wavelength by no more than the specified amount.
- *Linearity* indicates the maximum power error in measuring the change in power of one laser line.
- *Polarization dependence* indicates the maximum displayed power variation as the polarization of the input signal is varied.
- *Display resolution* indicates the minimum incremental change in displayed power.

### Sensitivity

- *Sensitivity* is defined as the minimum power level of a single laser line input to measure wavelength and power accurately. A laser line with less than the minimum power may be measured but with reduced wavelength and power accuracy. For multiple laser lines input, sensitivity may be limited by total input power.

### Selectivity

- *Selectivity* indicates the ability to measure the wavelength and power of a weak laser line in the proximity of a specified stronger laser line and separated by the specified amount.

### Input Power

- *Maximum displayed level* indicates the maximum total input power (total of all laser lines present) to accurately measure wavelength and power.
- *Maximum safe input power* indicates the maximum total input power (total of all laser lines present) to avoid permanent optical damage to the instrument.

### Maximum Number of Lines Input

- *Maximum number of lines input* is the maximum number of displayed lines. If more than 100 lines are input, only the 100 longest wavelength lines are displayed.

### Input Return Loss

- *Input return loss* indicates the optical power reflected back to the user's fiber cable relative to the input power. It is limited by the return loss of the front panel connector, and assumes the user's connector is good.

### Measurement Cycle Time

- *Measurement cycle time* refers to the cycle time when measuring wavelength and power of laser lines. Specific advanced applications may require longer cycle times.

## Sensitivity<sup>4</sup>

|                                                                                |         |
|--------------------------------------------------------------------------------|---------|
| <b>700 to 800 nm</b> , single line input                                       | –20 dBm |
| <b>800 to 1200 nm</b> , single line input                                      | –25 dBm |
| <b>1200 to 1600 nm</b> , single line input <sup>5</sup>                        | –40 dBm |
| <b>1600 to 1650 nm</b> , single line input <sup>5</sup>                        | –30 dBm |
| <b>700 to 1650 nm</b> , multiple lines input <sup>1</sup>                      |         |
| 30 dB below total input power, but not less than single line input sensitivity |         |

## Selectivity

|                                                  |       |
|--------------------------------------------------|-------|
| 2 lines input separated by >100 GHz <sup>1</sup> | 25 dB |
| 2 lines input separated by >30 GHz <sup>1</sup>  | 10 dB |

## Input Power

|                                                          |         |
|----------------------------------------------------------|---------|
| <b>Maximum displayed level</b> (sum of all lines input)  | +10 dBm |
| <b>Maximum safe input level</b> (sum of all lines input) | +18 dBm |

## Maximum Number of Laser Lines Input

100

## Input Return Loss

|                                                |       |
|------------------------------------------------|-------|
| With flat contacting connectors                | 35 dB |
| With angled contacting connectors (option 022) | 50 dB |

## Measurement Cycle Time

|                                        |                               |
|----------------------------------------|-------------------------------|
| <b>Normal update mode</b> <sup>1</sup> | 1.0 sec (1 measurement/sec)   |
| <b>Fast update mode</b> <sup>1</sup>   | 0.33 sec (3 measurements/sec) |

## Wavelength Units

nm (vacuum or standard air), cm<sup>–1</sup>, THz

## Power Units

dBm, mW,  $\mu$ W

## Measurement Modes

List by Wavelength Table, List by Power Table, Single Wavelength and Power, Average Wavelength and Total Power

## Delta Modes

Delta Wavelength, Delta Power, Delta Wavelength and Power

## Built in Automatic Measurement Applications

|                                                                               |                                                                         |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>Signal-to-Noise Ratio</b> <sup>1</sup>                                     | >35 dB (0.1 nm noise bandwidth), lines above –25 dBm                    |
| <b>Signal-to-Noise Ratio<sup>1</sup> of Modulated Lasers (with Averaging)</b> | >35 dB (0.1 nm noise bandwidth), lines above –25 dBm, with 100 averages |

### Drift

Maximum, minimum, total drift (max-min) of wavelengths and powers over time

## Coherence length<sup>1</sup>

Fabry-Perot lasers, 1 to 200 nm coherence length, accuracy to within  $\pm 5\%$ , 0.75 sec cycle time

## Additional Features

Power Offset, Power Bars (On or Off), user adjustable Peak Excursion and Peak Threshold, user adjustable Start and Stop wavelength limits, Graphical display, Save and Recall instrument states.

## Inputs/Outputs

|                              |                                      |
|------------------------------|--------------------------------------|
| <b>Optical input</b>         | 9/125 $\mu$ m fiber                  |
| <b>Rear panel connectors</b> | GPIO, parallel printer port, AC Line |

## Dimensions and Weight

|                   |                                                                         |
|-------------------|-------------------------------------------------------------------------|
| <b>Dimensions</b> | 140 mm high x 340 mm wide x 465 mm deep<br>(5.5 in x 13.4 in x 18.3 in) |
| <b>Weight</b>     | 9 kg (19 lb)                                                            |

## Environmental

|                                   | Operational                                                                                                           | Storage                                            |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <b>Temperature</b><br>(warranted) | 0°C to +55°C                                                                                                          | –40°C to +70°C                                     |
| <b>Humidity</b><br>(type tested)  | <95% R. H. at +40°C,<br>5 day soak                                                                                    | Noncondensing<br>90% R. H. at +65°C<br>for 24 hrs. |
| <b>Shock</b><br>(type tested)     | 300 g, half sine,<br>2 msec pulse                                                                                     |                                                    |
| <b>Vibration</b><br>(type tested) | Random, 5 g rms<br>5 to 500 Hz, 10 min./axis<br><br>Sine, 0.75 g (0 to peak)<br>5 to 500 Hz, 1 octave/min.            |                                                    |
| <b>EMC</b>                        | Conducted and radiated interference is in compliance with CISPR Pub 11, IEC 801-2, IEC 801-3, IEC 801-4 and IEC 555-2 |                                                    |

Note: “type tested” means tested, but not warranted, for continuous operation.

## Power Requirements

|                              |                                |
|------------------------------|--------------------------------|
| <b>Voltage and frequency</b> | 88 to 269 VAC, 45 Hz to 440 Hz |
| <b>Maximum power</b>         | 70 watts max (125 VA max)      |

<sup>1</sup> Characteristic

<sup>2</sup> For lines separated by less than 30 GHz, wavelength accuracy is reduced.

<sup>3</sup> 1200 to 1600 nm, lines above –30 dBm

<sup>4</sup> Contact HP for availability of special instruments with higher sensitivity.

<sup>5</sup> Spurious free under Preset conditions

## Ordering Information

### Agilent 86120B Multi-Wavelength Meter

Standard instrument includes a front-panel FC/PC optical fiber connector interface and a User's Manual.

#### Connector options replacing the standard FC/PC connector interface:

|                   |        |
|-------------------|--------|
| <b>Option 011</b> | HMS-10 |
| <b>Option 013</b> | DIN    |
| <b>Option 014</b> | ST     |
| <b>Option 017</b> | SC     |

**Option 022** Replace flat physical contact interface with angled physical contact interface

#### Additional connector interfaces can be ordered separately:

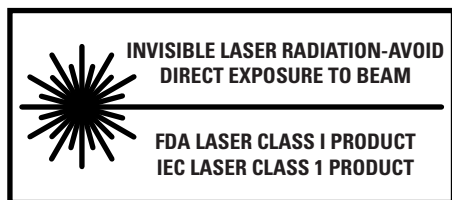
|                |                                      |
|----------------|--------------------------------------|
| <b>81000AI</b> | Diamond HMS-10 connector interface   |
| <b>81000FI</b> | FC/PC/SPC/APC connector interface    |
| <b>81000GI</b> | D4 connector interface               |
| <b>81000KI</b> | SC connector interface               |
| <b>81000SI</b> | DIN 47256/4108.6 connector interface |
| <b>81000VI</b> | ST connector interface               |
| <b>81000WI</b> | Biconic connector interface          |

#### Fixed external 10 dB attenuators:

|                   |                              |
|-------------------|------------------------------|
| <b>Option 412</b> | FC/PC                        |
| <b>Option 417</b> | FC/APC (requires option 022) |

#### Other options:

|                   |                                                                     |
|-------------------|---------------------------------------------------------------------|
| <b>Option 512</b> | Upgrade of existing Agilent 86120A to Agilent 86120B specifications |
| <b>Option UK5</b> | Nylon carrying case with shoulder strap                             |
| <b>Option UK6</b> | Commercial calibration certificate with test data                   |



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Tokyo 192-8510, Japan  
(tel) (81) 426 56 7832  
(fax) (81) 426 56 7840

#### Latin America:

Agilent Technologies  
Latin American Region Headquarters  
5200 Blue Lagoon Drive, Suite #950  
Miami, Florida 33126, U.S.A.  
(tel) (305) 267 4245  
(fax) (305) 267 4286

#### Australia/New Zealand:

Agilent Technologies Australia Pty Ltd  
347 Burwood Highway  
Forest Hill, Victoria 3131, Australia  
(tel) 1-800 629 485 (Australia)  
(fax) (61 3) 9272 0749  
(tel) 0 800 738 378 (New Zealand)  
(fax) (64 4) 802 6881

#### Asia Pacific:

Agilent Technologies  
24/F, Cityplaza One, 1111 King's Road,  
Taikoo Shing, Hong Kong  
(tel) (852) 3197 7777  
(fax) (852) 2506 9284

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