

# TB200

Supports All Blue, Red and Near Infrared Wavelength Bands

## Optical Power Meter



- Flat sensitivity characteristics in the 405 nm (blue), 660 nm (red) and 785 nm (near infrared) wavelength bands
- Sufficient margin provided by 18 mm dia. sized photo-receiving surface even at high NA (0.85)
- Influence of multiple reflection alleviated by low-reflectivity sensor surface
- High-power measurement up to 100 mW
- Measurement interval of about 100 msec
- Full remote control enabled by standard USB interface

# Optical Power Meter

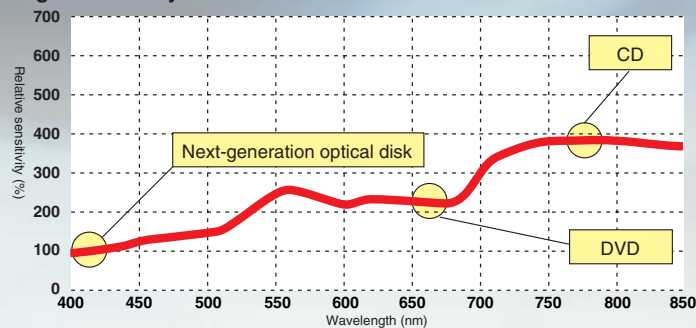
TB200 Optical Power Meter has been optimally designed for application in development through to manufacture of next-generation optical disks, DVDs and CDs. The TB200 enables virtually error-free measurement even without measurement of the wavelength of the laser diode used on optical disks. What's more, a major feature of the TB200 is its large-size 18 mm diameter sensor. With this sensor, you no longer need to accurately position the sensor in lens optical systems whose high numerical aperture (NA) is 0.85.

# TB200



## Sensitivity Characteristics Easily Applicable in Wavelength Bands Used by Optical Disks

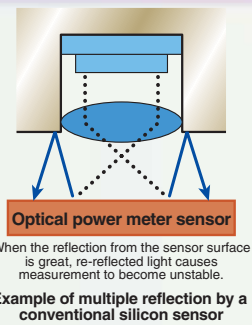
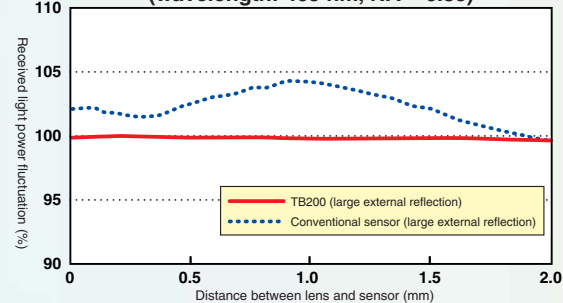
Wavelength sensitivity characteristics



Conventional optical power meters, that use a silicon sensor, have sensitivity characteristics that are dependent on the wavelength in all measurement regions. For this reason, the light emission wavelength must be known beforehand to ensure accurate measurement. The TB200, however, has been designed so that its sensitivity characteristics are flat near the blue (405 nm), red (660 nm) and near infrared (785 nm) wavelength bands, which are used by various optical disks. As a result, the TB200 can measure with little error independently of light emission wavelength.

## Stable Measurement Independent of Distance from Lens

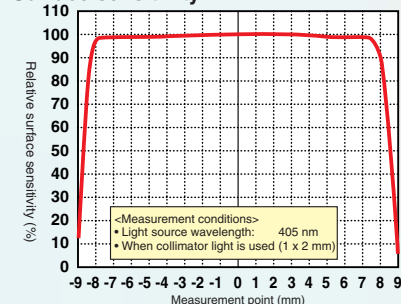
Influence of multiple reflection (wavelength: 405 nm, NA = 0.85)



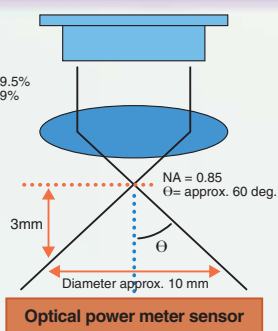
As conventional optical power meters do not perform processing to prevent reflection on the sensor surface, multiple reflection occurs between the sensor surface of the optical power meter and the lens holder, for example, of the optical pickup that emits the laser. As a result, correct measurement is not possible at some distances from the lens. The TB200, however, performs anti-reflection processing to prevent the influence of multiple reflection.

## Large 18 mm dia. Photo-receiving Sensor Ideal for Picking up High NA Light

Surface sensitivity



Relative surface sensitivity distribution  
 ±2 mm area from center: approx. 99.5%  
 ±5 mm area from center: approx. 99%

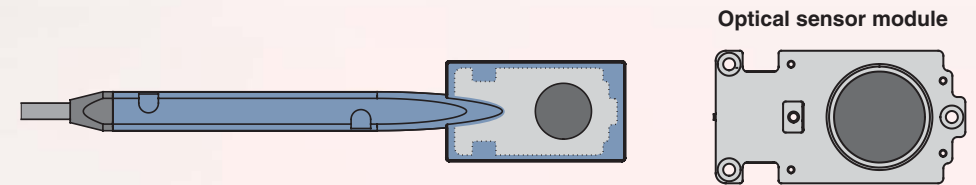


With high NA (numerical aperture) lenses, the sensor must be brought close to the laser emitter to ensure accurate measurement as these lenses have a large angle of incidence. As the maximum angle of incidence of lenses having 0.85 NA is about 60 degrees, the light receiving area is 10 mm in diameter at a distance of 3 mm from the focal point. The light receiving diameter of the TB200's sensor head is 18 mm (effective diameter: 14 mm or more). This means that stable measurement can be obtained using light emitted from high NA lenses even if the sensor is not accurately positioned.

## Sensor Head Designed for Use in Production Lines

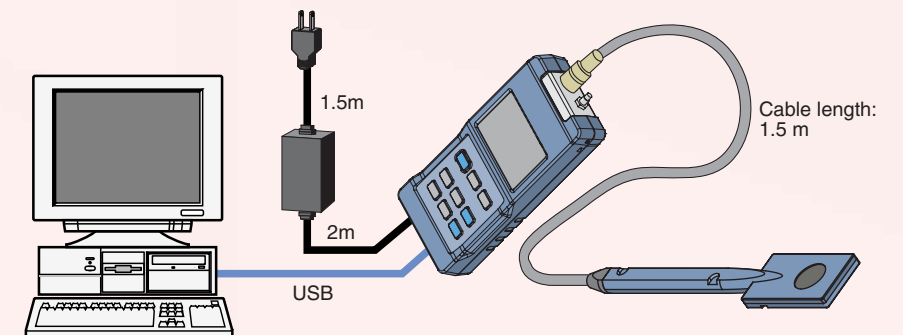
When the Optical Power Meter is used in production lines, the sensor is sometimes attached to manufacturing equipment or jigs. The TB200 has been designed so that the thin optical sensor module can be easily detached from the sensor head.

Note: Product quality is assured when the Optical Power Meter is shipped from the factory with its sensor mounted in its case. If the user removes the sensor from its case for use, the quality warranty will be voided.

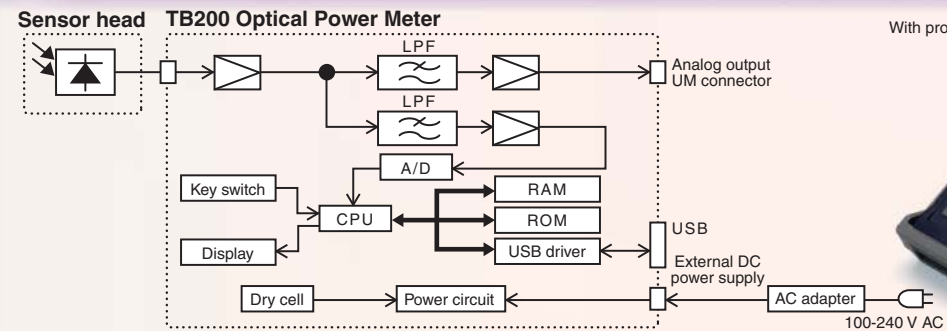


## Full Remote Control Enabled on the USB Interface

The capability for fast and full remote control is required on automated production lines. All TB200 functions can be fully remote-controlled at high speed on its USB interface. Measurement results can also be sent to a PC over the USB interface.



## Block Diagram



# Specifications

## TB200 Optical Power Meter Mainframe: 735201

### ●Environmental Conditions

Item	Environmental Condition
Operation-guaranteed temperature/humidity conditions	Body: 5 to +40°C (ambient temperature), 20 to 80% (no condensation)
Storage temperature/humidity	-20 to +60°C (ambient temperature), 20 to 80% (no condensation)

### ●Electrical Specifications

Item	Specification
Display	7-segment, 4-digit, w/ backlight
Display resolution	0.01 dB (When W unit is selected, floating point 4 digits past decimal point)
Unit display	Absolute value: dBm, mW, μW, nW Incremental value: dB
Wavelength setting range	400 to 850 nm
Wavelength sensitivity compensation increment	1 nm
Range selection	AUTO/HOLD
NA compensation range	0.500 to 2.000 (0.001 increments)
Optical power display range	1 μW (-30 dBm) to 100 mW (+20 dBm)
Measurement interval	Approx. 100 msec
Backlight	Lights when backlight key is touched, and goes out when key is touched again.
Analog output	0 to 2 V connector: UM connector (made by Hirose Electric)
Interface	USB (type B)
Sensor head	Model: 735221 (Model name of sensor head becomes 735201 when -CA1 or -CA3 integrated calibration is selected. However, its performance is the same.)
Power supply	AC adapter (rated input voltage: 100 to 240 V) 7 VA AAA alkali dry cell (operation time: approx. 24 hours)
Accessories	User's Manual, AC adapter

### ●List of Functions

Function	Brief Description
Optical power level measurement function	The optical power level received by the photo-receiving sensor is displayed on the display.
Range setting function	The mode can be switched to AUTO (range is automatically switched according to the received light level) and HOLD (range is held at a specified range).
Auto zero set function	Zero is automatically set when the power is turned ON. This frees the user from the need to set zero.
Wavelength sensitivity compensation function	The wavelength sensitivity can be compensated within the range 400 to 850 nm (in 1 nm increments). Matching the wavelength to the wavelength of the measured light source increases measurement accuracy.
Incremental value measurement function	Displays the incremental value from the reference value taking the measured received light level as the reference value. (unit: dB)
Absolute value measurement unit selection function	Display in dBm or W units can be switched. When the W unit is selected, mW/μW/nW is automatically selected according to the optical power and displayed. A fixed value in mW units also can be displayed.
Averaging function	Measured values are displayed after being averaged internally. The averaging count is fixed, and the average value is the result of 20 averaging operations. The average result is obtained by the moving average at each measurement interval.
NA compensation function	Error caused by the influence of the angled incidence characteristics of the sensor is compensated for when high NA is measured. Compensation values must, however, be selected and entered manually from the NA Compensation Tables (provided).
Backlight function	Turning the backlight ON allows the user to view display details even in the dark.
Resume function	The previous setting information is backed up. (only when the meter was turned OFF normally)
Analog output function	Analog voltages corresponding to the measured values are output for each range.
MAX hold function	The maximum value during a measurement is displayed.
USB communications function	Settings can be changed and measured values acquired over the USB interface. (When this function is in use, control is not possible using the meter's keys.)

## Sensor Head for TB200: 735221

### ●Environmental Conditions

Item	Environmental Condition
Operation-guaranteed temperature/humidity	0 to +60°C (ambient temperature), 20 to 80% (no condensation)
Storage temperature/humidity	-20 to +60°C (ambient temperature), 20 to 80% (no condensation)

### ●Electrical/Optical Characteristics

Item	Specification
Wavelength range	400 to 850 nm
Light-receiving element	Si-PD
Received light power range	1 μW (-30 dBm) to 100 mW (+20 dBm) Note 1)
Max. light receiving level	+20 dBm (100 mW) Note 1)
Max. power density	5 mW/mm <sup>2</sup> Note 1)
Uncertainty at reference conditions	±4% Note 2)
Input type	Spatial light
Accessories	TB200 Utility CD Note 3)

### ●Accessories

Accessory	Description
TB200 Utility CD	USB driver for Windows 2000, XP with Sample Soft Ware API (Application Program Interface) Calibration data Calibration data upload tool

- Note 1) Compensation values for this sensor head are provided in the TB200 Utility CD. These performance values are for when this data is uploaded to the TB200 Optical Power Meter for use.  
 Note 2) Condition: λ = 405 nm  
 Note 3) Reference conditions:  
 (1) Reference wavelength: λ = 405 nm (Add 0.5% when the wavelength is in the range of 400 to 420 nm.)  
 (2) Reference power: 1 mW  
 (3) Reference temperature: 23 °C ±3°C  
 (4) Reference beam shape: Distribution: Gaussian distribution, Radiated NA: 0.2, diffused light (50GI fiber output)  
 (5) Spectral width: 1 nm or less  
 (6) Light receiving position: Mechanical center  
 (7) Wavelength setting error: Within ±0.5 nm  
 (8) Not including secular changes of measuring equipment  
 (9) Uncertainty inclusion coefficient: k = 2  
 \* Uncertainty when only sensor head is sold. For details on uncertainty when the integrated calibration option is applied, refer to the "Remarks" column of the Model and Suffix Code table.

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# Model and Suffix Code

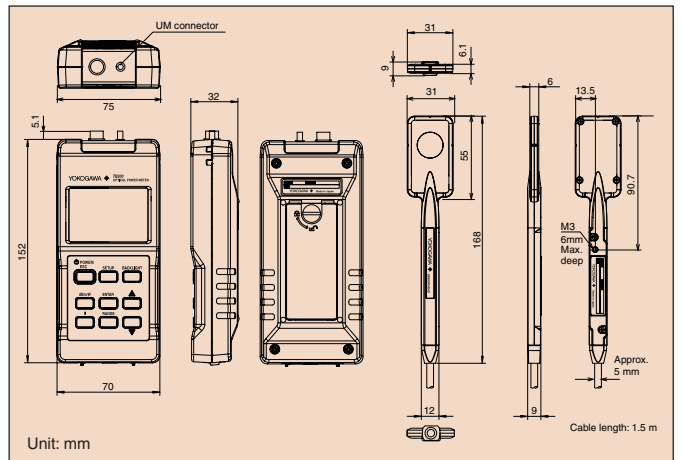
Name	Model	Basic Specification	Option Code	Description
TB200 Optical Power Meter	735201	-M		AC adapter JIS standard type (2-pin)
		-C		AC adapter UL/CSA standard type (UL2P)
		-F		AC adapter VDE standard type (CEE-C2)
		-G		AC adapter AS standard type (AS2P)
		-J		AC adapter BS standard type (BS2P) square
		-CA0		Without sensor head (specified when only the body is ordered)
		-CA1		With sensor head (405 nm, 1 wavelength calibration) Uncertainty under reference conditions: ±2.5%
-CA3		With sensor head (405/660/785 nm, 3 wavelength calibration) Uncertainty under reference conditions (405 nm): ±2.5% Uncertainty under reference conditions (660 nm): ±3.0% Uncertainty under reference conditions (785 nm): ±3.0%		
		/PR		Protector (with stand)
Sensor head for TB200	735221			Model when ordering only the sensor head

Note) When selecting the basic specification -CA1 and -CA3 integrated calibration option, the model name of the sensor head provided with the body is "735201," the same as the body. Though the model name is different from the name "735221" listed for when the sensor head only is sold separately, its functions are the same.

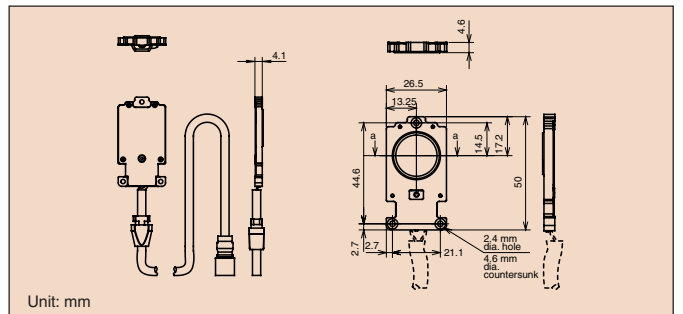
### ●Options

Part Name	Model	Description
Protector	SU2002A	Protector (with stand)
Soft carrying case	SU2006A	

# External Dimensions



(Reference) External dimensions when sensor head is disassembled



# Related Models

**TA220 Digital Jitter Meter**

Compatible with Blu-ray Disc standard

- Equalizer for Blu-ray Disc, PLL mounted
- Measurement of Data to Clock jitter and pulse width jitter
- Inhibit function, block sampling function
- Provided with Ethernet and GP-IB communications as standard

**CAUTION**  
 To ensure correct and safe use of this product, refer to the "User's Manual."

Subject to change without notice.  
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 Printed in Japan, 512(KP)