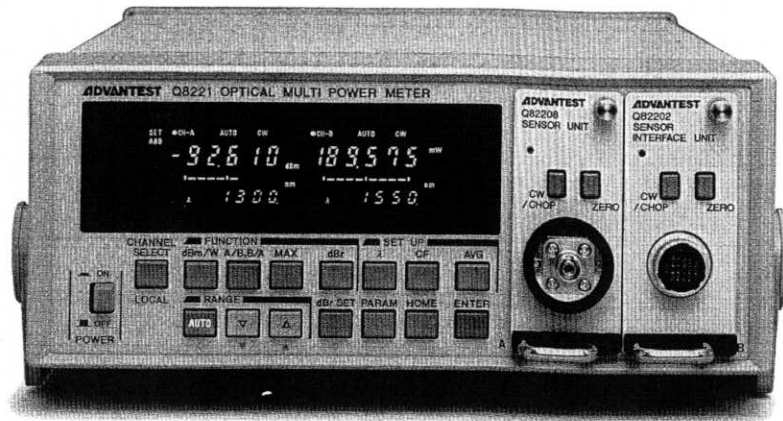


# Optical Measuring Instruments and Optical Device Test Systems

High-Accuracy, High-Sensitivity and High-Speed Optical Power Meter

## Q8221

- Seven Types of Optical Sensors and Nine Types of Light Sources Available
- High Accuracy :  
± 2.5% (at the Calibration Point)  
± 4.5% (over the entire Wavelength Range)  
Linearity: ± 0.5%
- Low Polarization Dependence :0.003 dB<sub>p-p</sub>
- High Sensitivity : -94 dBm
- High Power Input Level : +27 dBm
- High Speed Measurement :  
Sampling Rate of 100 times/sec



## Q8221

### Optical Multi Power Meter

#### ■ Two-Channel Plug-In System

Two channels of the Q8221 can be used individually or simultaneously. Seven types of optical sensors and nine types of light sources are available to accommodate diverse applications.

#### ■ Ensures Accuracy Over the Entire Range of Power and Wavelength

The optical sensors for Q8221 assure high accuracy of ±2.5% at calibration point. In broad band wavelength region, they assure ±4.5% accuracy by compensating the sensitivity curve over wavelengths of each sensors. Further more, the linearity of ±0.5% is assured. Not only at the calibration point, these sensors also assure at the broad band wavelength region and the level to be measured.

\* Calibrations of Q82208, Q82215 and Q82216 at 1550 nm are also available as options (OPT.25).

#### ■ Three Types of High-Sensitivity Sensors Noise Level : -94 dBm

The Q82208, Q82232 and Q82233 Optical Sensors achieves high sensitivity by cooling the InGaAs photo-diode. The Q82208 especially achieves -94 dBm. High power can be measured with high linearity up to +10 dBm with all three types.

#### ■ High Power Input Optical Sensor (Q82227) Maximum Input Power : +27 dBm

The Q82227 is capable of measuring light input up to +27 dBm. Thus, it is suitable for measuring output and the pumping light source of optical-fiber amplifiers, and LDs for optical CATVs.

#### ■ Low Polarization Dependency Optical Sensors (Q82232, Q82233) : 0.003 dB<sub>p-p</sub> or less

The Q82232 Optical Sensor achieves low polarization dependence of 0.003 dB<sub>p-p</sub>. By combining with Q8163 Polarization Scrambler, it can be used for high-speed and high precision PDI measurement of the optical devices.

#### ■ Sensors with Less Reflection and High-Return-Loss Adaptor with Minimum Reflection

The Q82208 Optical Sensor uses optical fiber with slant polished ends to suppress reflection (return loss of 50 dB or more). When using a PC polished connector, a high return loss of 45 dB or more can be obtained with the low-loss, high-return-loss adaptor (typical return loss without this adaptor is 14 dB). However, Q82233 Optical Sensor can obtain return loss of 45 dB without using the high-return-loss adaptor. These sensors fit optical fibers with a core diameter of 10 μm with NA 0.19 or less, making them suitable for measurement of dispersion shift fibers. FC, SC, ST, MU and plug-in connectors are available.

#### ■ Large-Caliber Optical Sensor (Q82216) (5 mmø)

When the Q8134 multi-channel light source is used and the MT connector adaptor (A08187) is attached to the Q82216 sensor, loss of tape fibers with up to 12 cores and MT connectors can be measured with remarkably high accuracy.

#### ■ High-Resolution Measurement

The Q8221 displays results of absolute power measurement (dBm) and relative power measurement (dBr) with 0.001 dB resolution. With GPIB output, 0.0001 dB resolution is achieved.

#### ■ Recording Function, PDL Measurement Function

The Q8221 is capable of storing data containing 400 points with the A and B channels independently. Furthermore, stored data can be directly output to an external plotter as a graph. Also, PDL measurement is very easy with Q8221, because it can display maximum and minimum values as well as the difference between the maximum and minimum values of the measured data.

# Optical Measuring Instruments and Optical Device Test Systems

*High-Accuracy, High-Sensitivity and High-Speed Optical Power Meter*

**Q8221**

## ● Q8221 Light Source Plug-In Unit Specifications

Model	Q81201	Q81202	Q81203	Q81204	Q81205	Q81206	Q81207	Q81211	Q81212
Photoemitting element	LED	LED	LED	LED	LED	Edge-Emitting LED	Edge-Emitting LED	FP-LD	FP-LD
Wavelength	850 ± 25 nm	1310 ± 40 nm	1550 ± 30 nm	1310 ± 10 nm	1550 ± 10 nm	1300 ± 30 nm	1550 ± 30 nm	1310 ± 10 nm	1550 ± 20 nm
Spectrum Half value	55 nm or less	160 nm or less	210 nm or less	20 ± 5 nm	20 ± 5 nm	100 nm or less	140 nm or less	5 nm or less	10 nm or less
Output power	-15 ± 1 dBm* <sup>1</sup>	-20 ± 1 dBm* <sup>1</sup>	-43 ± 1 dBm* <sup>2</sup>	-35 ± 1 dBm* <sup>1</sup>	-53 ± 1 dBm* <sup>2</sup>	-14 ± 1 dBm* <sup>2</sup>	-17 ± 1 dBm* <sup>2</sup>	0 ± 1 dBm* <sup>2</sup>	0 ± 1 dBm* <sup>2</sup>
Output power (variable)	—	—	—	—	—	—	—	0 to -6 dB, in 0.1 dB steps	0 to -6 dB, in 0.1 dB steps
Stability	(23 ± 1°C/1min)	—	—	—	—	—	—	± 0.01 dB or less	± 0.01 dB or less
	(23 ± 2°C/1h)	± 0.02 dB or less	± 0.02 dB or less	± 0.04 dB or less	± 0.02 dB or less	± 0.04 dB or less	—	—	—
	(Between 0 to 40°C ± 2°C/1h)	—	—	—	—	—	± 0.02 dB or less	± 0.04 dB or less	± 0.05 dB or less
	(0 to 40°C/8h)	± 0.2 dB or less	± 0.2 dB or less	± 0.2 dB or less	± 0.2 dB or less	± 0.2 dB or less	± 0.4 dB or less	± 0.4 dB or less	± 1 dB or less
Output waveform:	CW or chopped light: 270 Hz (± 0.1%) with duty of 50 ± 5%, 2 kHz/4 kHz (± 0.1%) with duty of 50 ± 10%								
Output connector:	FC type								
Preheating time:	60 minutes after power on								

\*1 At the photoemitting edge of 2 m fiber (GI 50/125 μm)

\*2 At the photoemitting edge of 2 m fiber (SM 10/125 μm)

### Optical Power Measurement Specifications

**Sensor plug-in channels :** 2 (Channels A and B)

#### Resolution:

dBm/dB display: 0.001 dB (or 0.0001 dB for data output via GPIB)

W display: Max. 199,999 counts

#### Measurement mode:

CW or chopped light (270 Hz) measurement mode selectable

#### Sensor wavelength sensitivity compensation:

If a wavelength is entered, an internal compensation value for the sensor wavelength sensitivity at that wavelength is automatically applied.

#### Relative value measurement (dBr):

The value relative to reference value is measured and displayed in dB with a maximum resolution of 0.001 dB (or 0.0001 dB for data output via GPIB).

**Unit display:** W (mW, μW, nW, pW), dBm, dB

**Display of measured value:** 5-1/2 digit (7-segment FL Device)

**Range :** Automatic, manual, remote

**Integration time:** 100, 20, 7, or 2 msec.

#### Measurement speed:

Approx. 100 measurements/second (with 2-msec. integration time and one-channel operation)

Approx. 50 measurements/second (with 7-msec. integration time and one-channel operation)

Approx. 30 measurements/second (with 20-msec. integration time and one-channel operation)

Approx. 9 measurements/second (with 100-msec. integration time and one-channel operation)

#### Level meter:

Displays with up to 11 dots according to measured values.

#### Calculation function:

A/B, B/A, and CF

W display: Measured values is multiplied by a constant.

dBm display: Offset is possible.

**Maximum hold function:** Displays the maximum measured value.

**Averaging function:** The number of averaging can be set to 2 to 256 using the running averaging method.

### Light Source Plug-In Unit Specifications

#### Unit Plug-in channels:

2 (Channels A and B)

#### Output power adjustment function:

The output power can be set from 0 to -6.0 dB with a setting resolution of 0.1 dB steps.

**Output mode:** CW or chopped light (270 Hz, 2 kHz, or 4 kHz) mode selectable.

### Other Functions

**Record function; PDL/PDR\* measurement functions:** Can store up to 400 measurement data items for each of channels A and B in the backup memory. Stored data items can be read by a personal computer via the GPIB interface. The maximum value, minimum value and the difference of them (Max.-Min.) are displayed.

**Memory function:** Up to five settings can be stored and read for each of channels A and B.

**Direct plotting function:** Measurement data items stored by the record function can be plotted directly to an external plotter in the form of graphs.

#### Connectable plotters:

R9833 (ADVANTEST)

682-XA (Hitachi Electronics)

HP7550A (Hewlett-Packard)

**Brightness adjustment function:** The brightness of the display can be adjusted in five steps.

#### Output functions specifications:

**GPIB interface:** IEEE488-1978

**Analog output:** Outputs analog signal which is proportional to the input optical power.

**Output voltage:** 0 to +2 V(F.S.) for each range

**Output impedance:** 0.5 Ω or less

**Output connector:** BNC Connector

### General Specifications

**Ambient temperature:** 0 to +40°C (85%RH or less)

**Storage temperature:** -25 to +70°C

**Power requirements:** 100 to 240 VAC, 48 to 66 Hz

#### Power consumption:

50 VA or less (including the plug-in unit and sensors)

**Dimensions:** Approx. 212 (W) × 88 (H) × 360 (D) mm

**Mass:** 3.9 kg maximum (including the plug-in unit)

#### Standard accessories:

Power cable × 1

Fuse × 2

Instruction manual × 1

\*PDR: Polarization Dependent Ratio