

OPTICAL POWER METER  
OPM37LAN

Instructions

**sanwa**

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## **OPM37LAN Instructions**

### **1. Introduction**

This instrument is a power meter for exclusive use with optical fibers, that employs a Si photodiode as the light sensor. It can accept a variety of optical connectors by changing the optical connector adapter.

The optical power measuring functions include;

absolute value measurements in dBm and W measuring modes, and  
relative value measurements in dB(REL) and W(REL) measuring modes.

In addition to the above measuring functions, this instrument also provides:

Offset function, averaging function and direct-reading wavelength switching function (650 nm, 780 nm, 800 nm, 850 nm, 880 nm).

The RS-232C interface is provided to enable transfer of measurements to a PC.

### **2. Caution**

- Do not look directly at the measured light and be careful against penetration of reflected light in your eye.  
Incidence of high-power light in your eye may cause drop in your eyesight or loss of eyesight in the worst case.  
Special care is required when using the IR light because it is not visible for human eyes.
- Avoid applying light exceeding the measuring limit (20 mW) because excessive light input may destroy the photodiode used in the light sensor.
- When the power source is changed in the middle of measurement (battery ⇔ AC adapter), the instrument is reset to the initial status.
- Warm up the instrument for a few minutes before proceeding to measurement.
- Avoid using the instrument in a place with high temperature and humidity or subject to vibrations.
- Do not touch the light sensing surface of the photodiode directly with your hand.  
Contamination of the surface will result in measurement errors.  
If the light sensing surface is contaminated, wipe lightly with a piece of tissue paper moistened with alcohol.
- This instrument has been calibrated in combination with the sensor probe.  
Do not use other combination of sensor probe and instrument than that provided in this specific package.

### 3. Standard Accessories

Exclusive optical sensor	x 1
• Sensor extension cord, 2 meters	x 1
• Instructions manual	x 1
• 006P alkaline battery	x 1
• AC adapter (AD-30) – 2.	x 1
• Type FC (F01) optical connector adapter	x 1

#### (Optional Accessories)

• Model KB-RS-OPM:	x 1
RS-232C connection cable (for PC connection), D-sub 9-pin female connector (with inch screws) on both end, cross wiring, 2 meters.	
• Model OPA-F04:	
Type SC (F04) optical connector adapter	x 1
• Model OPA-F05:	
Unidirectional loss link (type F05)	x 1

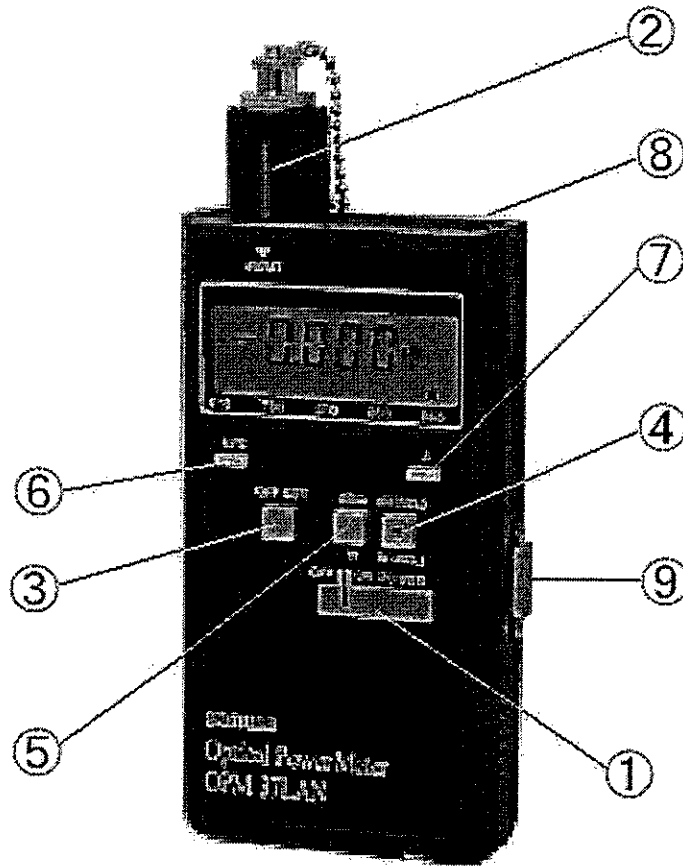
\* Please inquire us for other optical connectors.

#### 4. Specifications

Model	OPM37LAN
Display	4-digit digital display (dBm/W)
Range	8 ranges, automatic
Light sensor	Si photodiode (5.8 x 5.8 mm)
Measuring wavelength range	400 nm to 1100 nm
Optical power measuring range	-60.00 dBm to +13.01 dBm 1,000 nW to 20.00 mW
Light input method	Direct photodiode input. Type FC connector adapter provided as standard. (Optional accessories: Optical connector adapters)
Direct-reading calibration wavelengths	650 nm, 780 nm, 800 nm, 850 nm, 880 nm
Measuring accuracy	±5% (@ direct-reading calibration wavelength, 20 dBm/10 μW)
Measuring resolution	dBm/dB(REL) modes: 0.01 dB W/W(REL) modes: 0.01% to 0.11%
Measuring interval	3.33 times/sec.
Measuring functions	dBm, dB(REL), W and W(REL) measurements, direct-reading wavelength switching, offsetting, averaging (sequential averaging of 20 data items), RS-232C output, low battery voltage indication.
Power supply	006P alkaline battery or AC adapter (AD-30)- 2
Environmental condition	Temperature : 0°C to 40°C Humidity : Max. 80%RH (without condensation)
Dimensions	Main instrument : 164 x 85 x 35 mm Optical sensor : Ø25 x 26 mm
Weight	Main instrument : 300 grams Optical sensor : 25 grams

## 5. Operating Instructions

### Nomenclature



#### OPM37LAN

- |                  |  |
|------------------|--|
| ① POWER switch   | Slide switch for turning the instrument ON and OFF.  |
| ② Optical sensor | Surface area size: 5.8 x 5.8 mm.   |
| ③ Offset key     | Key for use in offsetting of the light sensor.<br>To perform offsetting, block the optical sensor, press this key and adjust the meter reading to zero.<br>(Note) If the meter reading is 1.001 nW or more, the light sensor may not be blocked properly so offsetting should not be performed in this case. |

- ④ dBm/W key      Key for measuring the absolute value of the input optical power. Each press switches the dBm measuring mode and W measuring mode alternately.  
The instrument is always set for the dBm measuring mode in the initial status after power ON.
- ⑤ REL key      Key for measuring the relative value of the input light power.  
The display at the moment this key is pressed is stored as the reference value, and the instrument displays the relative value of measurement after change in the light.  
The LED in the key lights during the REL measuring mode. Press the dBm/W key to exit from the REL measuring mode.  
Note that REL measurement is not possible at -60 dBm or below ("-LO dBm" is displayed to indicate this).
- ⑥ AVE key      Key for switching the averaging mode ON/OFF.  
Press the key to display the average of 20 data items obtained by sequential averaging. The LCD shows the "AVE" marking during averaging.  
Press the key again to exit from the averaging mode.
- ⑦  $\lambda$  key      Key for switching the direct-reading wavelengths.  
The wavelength is set to 850 nm in the initial status after power ON.  
Each press of the key switches the wavelengths in cycle of:  
850 nm → 880 nm → 650 nm → 780 nm → 800 nm →  
850 nm...
- The set wavelength is indicated by the position of a dot in the LCD.
- ⑧ AC adapter jack      Connection plug for the AC adapter (AD-30).  
(Do not use other AC adapter than specified.)
- ⑨ RS-232C data output connector (D-sub 9-pin male)      Connector for the PC. Use a cross-connected cable equipped with D-sub 9-pin female connectors (inch screws) on both ends.

## RS-232C Data Output Specifications

As the data is output permanently while the instrument is ON, it is not required to send any command from the PC application.

### ◇ Data output format

Data is output in ASCII codes in the order as shown below.

(Assuming that  $\lambda = 650 \text{ nm} \rightarrow \text{A nm}$ ,  $780 \text{ nm} \rightarrow \text{B nm}$ ,  $800 \text{ nm} \rightarrow \text{C nm}$ ,  
 $850 \text{ nm} \rightarrow \text{D nm}$ ,  $880 \text{ nm} \rightarrow \text{E nm}$ )

### Examples)

In dBm mode,  $-12.34 \text{ dBm}$ ,  $\lambda = 850 \text{ nm}$ :

NOR,  $-12.34\text{dBm}$ , Dnm, CRLF

In W mode,  $-12.34 \mu\text{W}$ ,  $\lambda = 880 \text{ nm}$ :

NOR,  $12.34\mu\text{W}$ , Enm, CRLF

In dB(REL) mode,  $12.34 \text{ dB}$ ,  $\lambda = 650 \text{ nm}$ :

REL,  $12.34\text{dB}$ , Anm, CRLF

In W(REL) mode,  $12.34 \mu\text{W}$ ,  $\lambda = 780 \text{ nm}$ :

REL,  $12.34\mu\text{W}$ , Bnm, CRLF

In dBm mode + AVE mode,  $-12.34 \text{ dBm}$ ,  $\lambda = 800 \text{ nm}$ :

AVE,  $-12.34\text{dBm}$ , Cnm, CRLF

In W mode + AVE mode,  $12.34 \mu\text{W}$ ,  $\lambda = 850 \text{ nm}$ :

AVE,  $12.34\mu\text{W}$ , Dnm, CRLF

In dB(REL) mode + AVE mode,  $12.34 \text{ dB}$ ,  $\lambda = 880 \text{ nm}$ :

AVE/REL,  $12.34\text{dB}$ , Enm, CRLF

In W(REL) mode + AVE mode,  $12.34 \mu\text{W}$ ,  $\lambda = 650 \text{ nm}$ :

AVE/REL,  $12.34\mu\text{W}$ , Anm, CRLF

Low battery, in dBm mode,  $-12.34 \text{ dBm}$ ,  $\lambda = 850 \text{ nm}$ :

NOR,  $-12.34\text{dBm}$ , Dnm, LBCRLF

Note : CR = Carriage Return.    LF = Line Field.    LB = Low Battery.

◇ RS-232C communication specifications

Communication rate:	9600 bps fixed
Data bits	8 bits
Parity	None
Stop bit	1 bit

◇ How to download data using Windows standard accessory HyperTerminal

- 1) Connect the instrument to the RS-232C port of your PC and turn the instrument ON.
- 2) In the Communication setting, set one of COM1 to COM4 Direct according to the port in use on your PC.
- 3) In "Property", set the port as shown below.

bit/sec.	9600 bps
Data bits	8 bits
Parity	None
Stop bit	1 bit
Flow control	Hardware

- 4) In the Communication menu, select [Connect] to start data reception.

## 6. Measurement Method

### Measuring procedure

- 1) Set the POWER switch to ON.

The initial status of the instrument after power ON is as follows.

Range:	Maximum sensitivity range
Mode:	dBm measuring mode
Wavelength:	850 nm
Offset:	OFF
Averaging:	OFF

- 2) Perform offsetting.

Before proceeding to measurement, be sure to perform offsetting by blocking any light incident to the light sensor, then pressing the Offset key and adjusting the meter reading to zero.



◇ Offset method

Block the light sensor and press the Offset key.

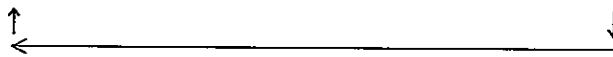
If the meter reading is 1.000 nW or less, adjust it to zero.

If the meter reading is 1.001 nW or more, the optical sensor may not be blocked properly. Do not adjust the meter reading to zero in this case.

3) Set the measuring wavelength using the  $\lambda$  key.

Press the  $\lambda$  key to switch the measuring wavelength:

850 nm → 880 nm → 650 nm → 780 nm → 800 nm



The set wavelength is indicated by the position of a dot in the LCD.

When performing measurement using a wavelength other than the five direct-reading wavelengths, use the closest direct-reading wavelength to the measuring wavelength then correct the meter reading according to the sensitivity correction data.

4) Connect connector of the optical fiber transmitting the measured light to the instrument and perform measurement as described below.

◇ Absolute optical power level measurement in dBm measuring mode

The instrument is set to the dBm measuring mode automatically after power ON.

When the measured optical power is:

-60.00 dBm or less, "-LO dBm" is displayed.

+13.01 dBm or more, "HI dBm" is displayed.

To switch the W measuring mode to the dBm measuring mode, press the W/dBm key.

◇ Absolute optical power level measurement in W measuring mode

When the measured optical power is

over +20.00 mW "HI .mW" is displayed.

To switch the dBm measuring mode to the W measuring mode, press the W/dBm key.

◇ Relative optical power measurement in dB(REL) measuring mode

In dBm measuring mode, press the REL key to enter the dB(REL) measuring mode. The optical power value at the moment the REL key is pressed is stored in memory as the reference value, and the measurements in this mode provide the relative values with respect to the reference value.

The LED in the REL key lights during the dB(REL) measuring mode.

When the measured optical power is:

-60.00 dBm or less, "-LO dB(REL)" is displayed.

+13.01 dBm or more, "HI dB(REL)" is displayed.

Press the dBm/W key to exit from the REL measuring mode.

◇ Relative optical power measurement in W(REL) measuring mode

In W measuring mode, press the REL key to enter the W(REL) measuring mode.

The optical power value at the moment the REL key is stored in memory as the reference value, and the measurements in this mode provide the relative values with respect to the reference value.

The LED in the REL keys lights during the W(REL) measuring mode.

When the measured optical power is:

over + 20.00 mW "HI .mW" is displayed.

Press the dBm/W key to exit from the REL measuring mode.

◇ Averaging measurement

In any measuring mode, press the AVE key to display the result of sequential averaging of the past 20 data items.

The LCD shows the AVE marking during averaging.

Press the AVE key again to exit from the AVE mode.