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AS-61750

AQ-2107 OPM UNIT

INSTRUCTION MANUAL

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AQ-2106 OPM Unit External Views ASD-61750

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SECTION 1
GENERAL INFORMATION

1.1 INTRODUCTION

This manual describes the procedures for operation and simple maintenance of the AQ-2107 OPM Unit.

1.2 GENERAL

The AQ-2107 is a plug-in unit (OPM unit) for the AQ-2105 optical power meter.
A variety of accessories, including connector adapters and bare fiber adapters, are available for the instrument.

1.3 SPECIFICATIONS

The specifications for the AQ-2107 are given in Table 1-1.

Table 1-1 Specifications for the AQ-2107

Wavelength range		0.75 to 1.7 μm
Application		Light from a small-aperture silica fiber
Input system		Direct photodiode input (See NOTE below.)
Sensor input diameter		About 2 mm
Optical input power range	CW light	– 60 to + 10 dBm 1 nW to 10 mW
	270 Hz chopped light	– 80 to + 0 dBm 10 pW to 1 mW
Reference wavelength		1.3 μm

NOTE: The AQ-9335 connector adapter (FC: standard) (option) should be used in combination.

1.4 COMPOSITION

The AQ-2106 OPM Unit is provided with the standard accessories listed at the end of the manual.

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SECTION 2
PREPARATION FOR USE

2.1 INTRODUCTION

This section contains the procedures for unpacking, acceptance inspection, and repacking.

2.2 UNPACKING AND ACCEPTANCE INSPECTION

This apparatus has been factory inspected, mechanically and electrically, prior to shipment to ensure that it gives satisfactory performance. When it is received, promptly unpack and check it for damage sustained in transit.

When unpacking the apparatus, save the wooden box, corrugated cardboard box, cushions, and other packing materials except consumables like steel bands and wrapping paper where possible so that they may be reused when the apparatus is to be packed again for shipment.

2.2.1 Mechanical Inspection

Visually inspect the apparatus for damage sustained in transit, then check its panel controls like switches and knobs for looseness or other faults. It is also recommended that the accessories and spare parts be checked against the packing list.

2.2.2 Performance Test

If the apparatus is found by the mechanical inspection to be in good order externally, then test it according to the procedures described in Section 5 to check its performance for compliance with the specifications set forth in Table 1-1.

2.3 DAMAGE OR FAULT

If the apparatus is found damaged or faulty in the acceptance inspection, immediately report the damage or fault to the nearest dealer.

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2.4 REPACKING

When repacking the apparatus, use the packing materials, if saved for later use. If they have not been saved, repack the apparatus, exercising care as suggested below.

(1) Wrap the apparatus in strong paper like tarpaulin paper or vinyl sheeting. Protect all the protrusions with cushions against damage.

(2) Place the wrapped apparatus in a wooden or cardboard box which is larger by about 10 cm than the apparatus on all sides.

(3) Fill all open spaces between the apparatus and the box with polyurethane foam or any other suitable cushioning material. The apparatus may rattle and be damaged in transit, if cushioning is insufficient.

(4) Cover the wooden box and brace it up with steel bands.
If a corrugated cardboard box is used, seal it with adhesive tape.

(5) Indicate the contents and shipping marks in a legible and durable way.

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SECTION 3
PRECAUTIONS IN APPARATUS HANDLING

3.1 GENERAL PRECAUTIONS

This apparatus has been designed to withstand use in an adverse environment as much as possible. However, since it incorporates many precision parts, the user is required to observe the following points:

1) Do not subject the apparatus to an excessive impact.
   Its display section incorporating glass parts is particularly susceptible to impacts.
2) Do not leave the apparatus in a hot and humid environment for extended periods of time.
3) Do not set the apparatus near an object which transmits strong radiowaves or creates a strong magnetic field.
   Using the apparatus in such a location may cause it to malfunction.
4) Do not connect any unit other than the designated ones to this apparatus; or apparatus failure may result.

3.2 PRECAUTIONS IN USING OPTICAL PARTS

The precautions to be taken in using optical parts are set forth below.

3.2.1 Precautions in Handling

The plug-in units for use with this apparatus have optical parts on their front, so that observe the following cautions when handling them:

1) The optical output connector have been superfine- processed. Take care not to subject them to any strong impact.
2) When using a light source unit, take adequate care not to directly look at the output light; or your eye (retina) may be impaired.
3) Do not connect an optical fiber core to a light source unit using a bare fiber adapter. (An optical fiber core protruding from a bare fiber adapter may damage the optical output section of the unit.)

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3.2.2 Precautions in Measurement

1) Avoid, whenever possible, using the apparatus in a dusty place.
2) When connecting an optical fiber to this apparatus, clean the optical fiber end-face to come in the optical connector with absolute alcohol or Freon gas.

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SECTION 4
OPERATION

4.1 INTRODUCTION

This section describes the names and functions of the components of the AQ-2107.

4.2 COMPONENT NAMES AND FUNCTIONS

o External View

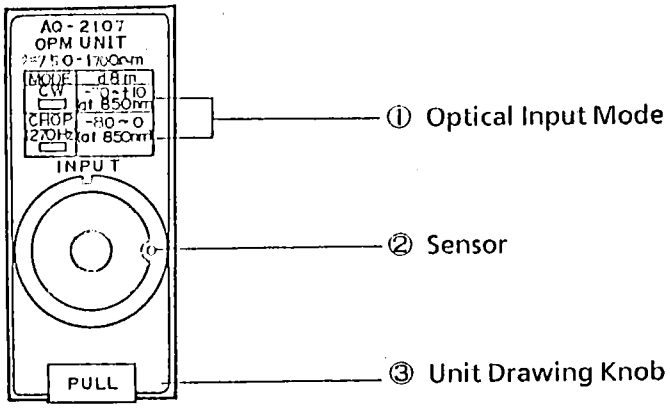


Fig. 4-1 Component Names

o Functions

Table 4-1 Description of Components

No.	Name	Sensor Marking	Description
①	Optical input mode	MODE CW CHOP (270 Hz)	The waveform of the optical input selected is displayed. An LED is lit to indicate which mode, continuous wave (CW) or 270 Hz chopped light (CHOP), is selected.
②	Sensor	INPUT	A component that detects optical signals. A various types of connector adapters (AQ-9335 series) can be attached to this sensor.
③	Unit drawing knob	PULL	This knob is used for drawing out the unit.

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4.3 SHIELDING CAP AND CONNECTOR ADAPTER SETTING

Remember that the method of sensor shielding differs between sensor types.

> NOTE: Be sure to securely shield each sensor; or leakage light may hinder offsetting.

1) Shielding cap setting

Each sensor is provided with a shielding cap. It is effective in shielding the sensor from spatial light.

(The method described in (2) will be convenient in optical fiber testing.)

To shield a sensor, shield the sensor front with the shielding cap and screw the cap in by turning it fully clockwise as shown in Figure 4-2.

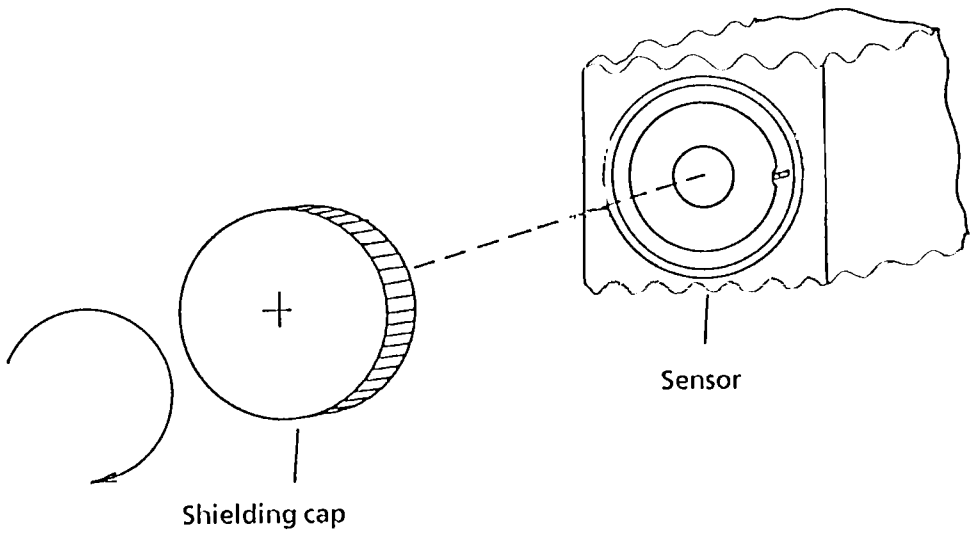


Fig. 4-2 How to set shielding cap

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2) Connector adapter setting

The OPM unit can be connected to different makes of connectors by using different connector adapters.

NOTE: o The connector adapter and the sensor have precision-finished fitting surfaces. Clean their fitting surfaces with absolute alcohol or Freon gas before fitting them together and after putting them apart.

o In handling the sensor, give utmost care to its sensitive part. (If their lens surface is scratched, they may fail to meet their performance specifications.)

a) How to set AQ-9335 connector adapter and shield sensor

Fix the connector adapter to the sensor, aligning their alignment marks as shown in Figure 4-3.

Next, screw the ring onto the connector adapter by turning it fully clockwise. To shield the sensor, put the black shielding cap over the optical receptacle.

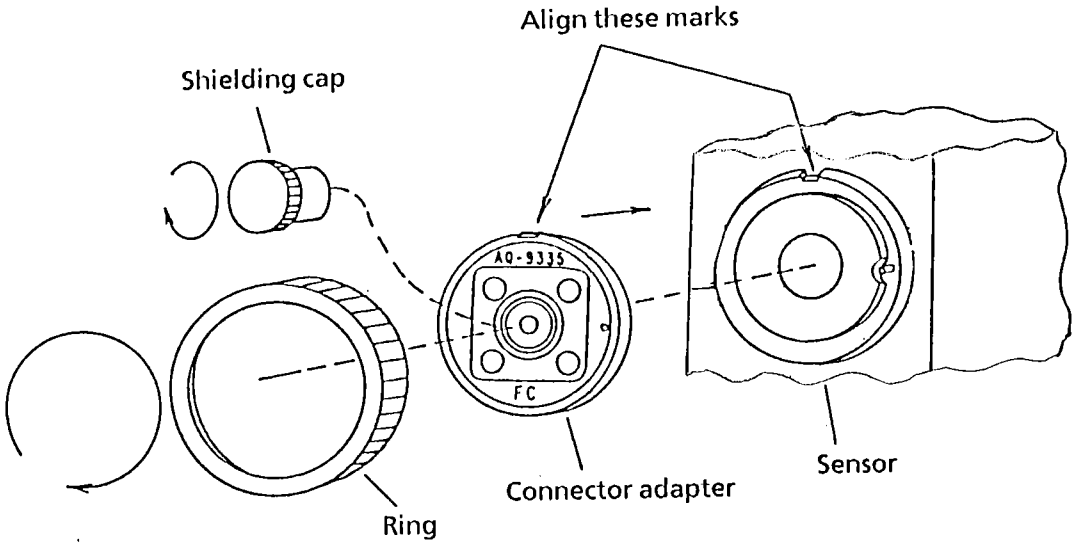


Fig. 4-3 How to set connector adapter and shield sensor

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4.4 INSTALLATION OF AQ-2107 INTO AQ-2105

- Before installing the AQ-2107 into the AQ-2105 optical power meter, be sure to turn off the AQ-2105.

  The AQ-2107 should be inserted along the rail as shown in Fig. 4-4.

  The unit can be installed to either of the A and B channels of the AQ-2105.

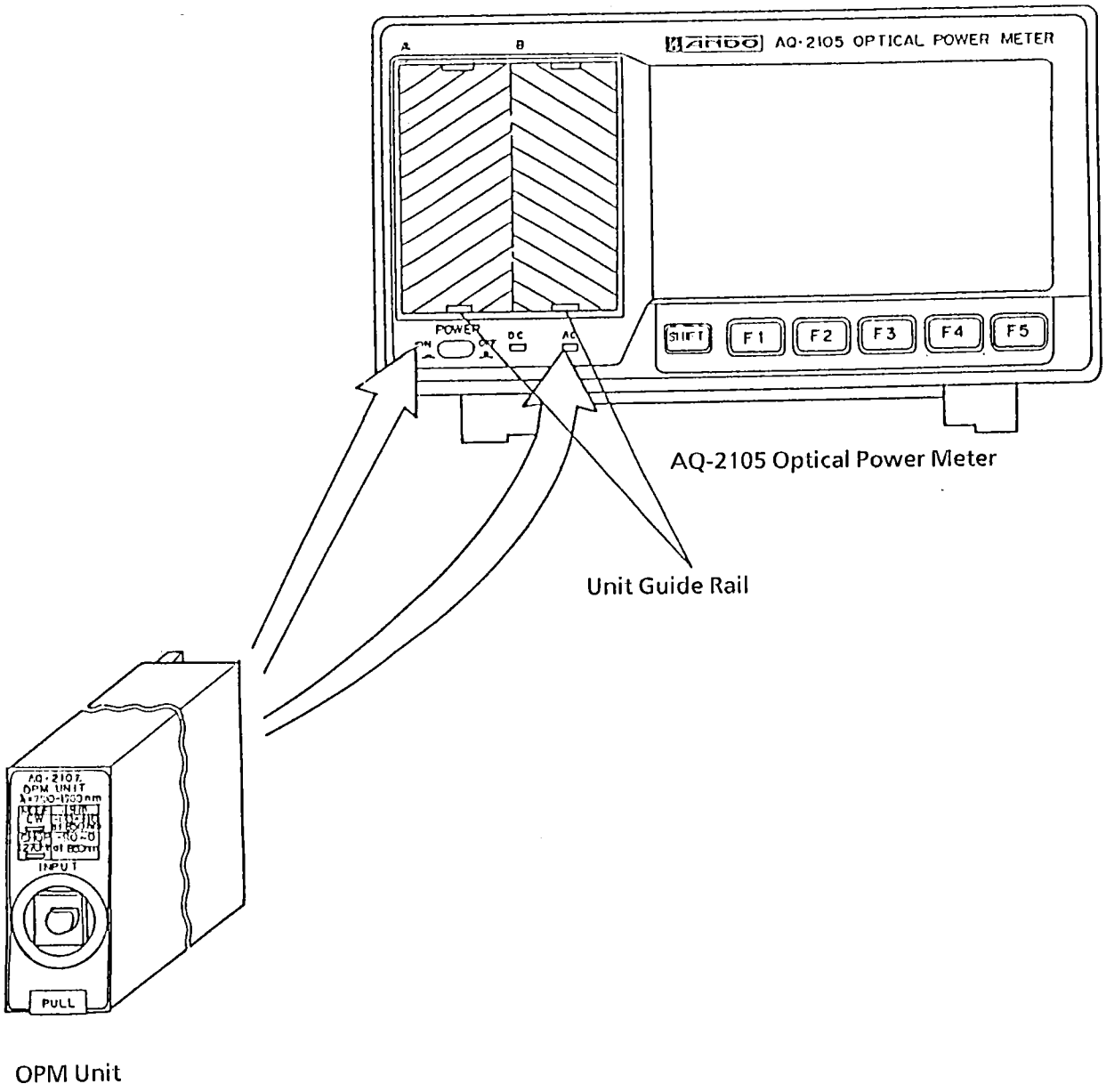


Fig. 4-4 Installation of AQ-2107 into AQ-2105

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SECTION 5
CIRCUITRY AND CONSTRUCTION

5.1 INTRODUCTION

This section contains general information on the circuitry and construction of the AQ-2107.

5.2 CIRCUITRY

The schematic circuit diagram of the apparatus is shown in Fig. 5-1.

The sensor section converts an optical input into an electrical signal. After amplified by the variable gain amplifier, the electrical analog signal is then fed to the AQ-2105 optical power meter.

5.2.1 Sensor Section

As the photoelectric transducer, the sensor section uses a Ge photodiode, which produces an electrical signal proportional to the optical input power.

For sensor wavelength sensitivity correction, a ROM is incorporated in the apparatus.

5.2.2 Variable Gain Amplifier

The variable gain amplifier consists of a dc amplifier for CW light, an ac circuit for 270 Hz chopped light, and a filter/rectifier.

(1) Dc amplifier

This circuit consists of an op amp and an active low-pass filter. It makes gain adjustment according to the optical input power.

(2) Ac amplifier

This circuit consists of an op amp and an active bandpass filter. It makes gain adjustment according to the optical input power.

(3) Filter/rectifier

This circuit includes an active bandpass filter and a dc detector. The output of the circuit, which is a direct current, is fed to the A/D converter.

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5.3 CONSTRUCTION

The external view and shape of the apparatus are shown in Drawing ASD-61750.

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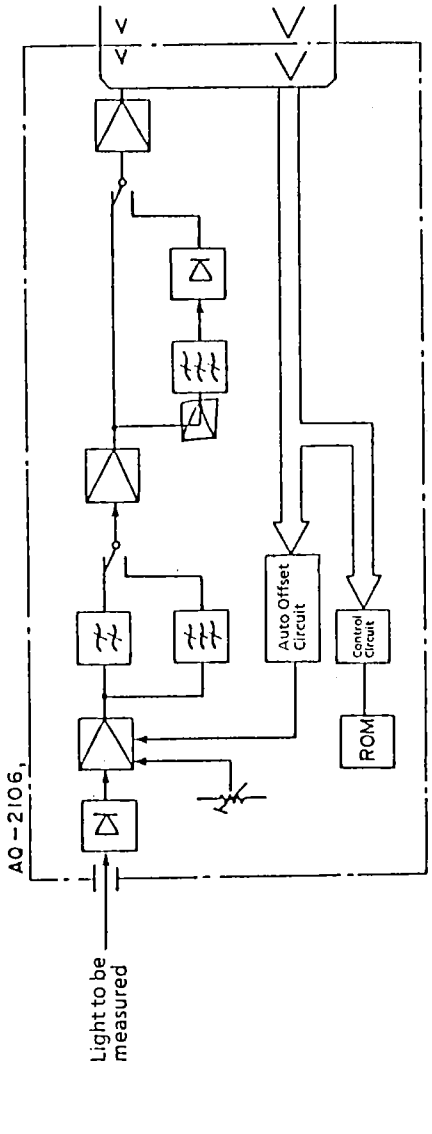


Fig. 5-1 AQ-2107 OPM Unit Circuit Diagram

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SECTION 6
MAINTENANCE

6.1 INTRODUCTION

This section contains the procedures for maintenance required to obtain optimum performance from the AQ-2107 throughout its useful life.

6.2 TESTING INSTRUMENTS

The testing instruments required for the maintenance of the apparatus are listed in Table 6-1. The performance characteristics shown in the table represent the minimum requirements with which the testing instruments are expected to comply.

Table 6-1 Testing Instruments

Instrument Name	Specifications		
Optical power meter	Power measurement range		1 pW to 10 mW
	Wavelength range	Long wavelength	1.0 to 1.7 μm
	Measurement accuracy, resolution	Within ±3%, 0.01 dB	
Optical variable attenuator	1.30 μm band	0 to ∞dB	
Light source	Wavelength Output level	1.30 μm −3 ± 1 dBm or more	
Optical fiber cord	GI	50/125 μm	
Exciter	Exciter or dummy fiber 1 km or more in length		

6.3 PERIODIC INSPECTION

Periodic inspections are effective in obtaining optimum performance from the AQ-2107 throughout its life and finding the malfunctioning elements, if any, before a trouble occurs.

Inspection periods are determined according to the conditions of operation and storage. The apparatus is designed and constructed to give long periods of stable and reliable service with a minimum amount of maintenance. However, it is recommended that periodic inspection be performed about twice a year.

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CAUTION

Do not tamper with the circuit parts of the apparatus.

6.4 MECHANICAL INSPECTION

Visually inspect the apparatus and its components exposed to view for damage or deformation, and also check the parts exposed to view for looseness and the switches and connectors for free movement.

6.5 PERFORMANCE TEST

The performance test is carried out to check the performance of the apparatus against the specification. It should be performed at the time of acceptance inspection, periodic inspection, or inspection after repair.

1) Basic operation check

Check the basic operations of the apparatus, using the following steps.

① Connect the apparatus to the AQ-2105 optical power meter and turn on the AQ-2105. If an abnormality is detected, the optical power meter shows a description of the error on its display and then stops.

② Connect the instruments together as indicated in Fig. 6-1. (The light source and optical ATT should match the wavelength type of the sensor.) Check if the indication of the apparatus changes according to the setting of the optical ATT.

NOTE

Be extremely careful so that the optical fiber cord plug and sensor input surface are free from dust. If they are dusty, clean them using cotton moistened with absolute alcohol.

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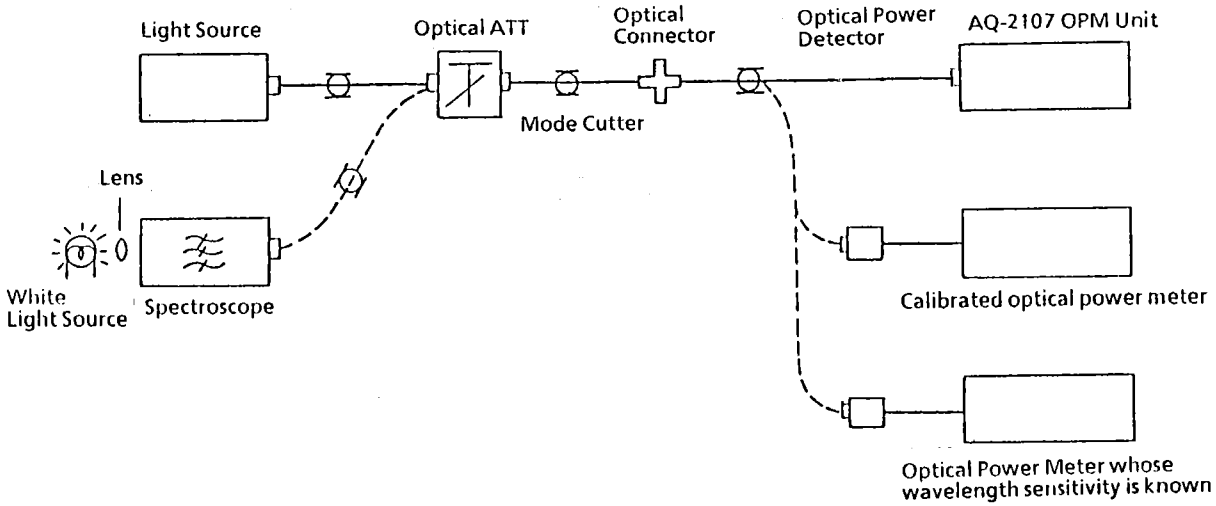


Fig. 6-1 Performance Test and Calibration

2) Performance test

① Connect the apparatus with a calibrated optical power meter as shown in Fig. 6-1, then make their level comparison.

② The optical-electrical performance characteristics of the apparatus can be checked by varying the setting of the optical ATT.

③ Wavelength sensitivity correction of the apparatus can be also made by using an optical power meter whose wavelength sensitivity is known, as indicated in Fig. 6-1.

NOTE

The absolute value calibration of the power level has been made at a wavelength of about1300nm with Ando's standard calorimeter.

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Standard Accesscries

Accessory name	Qty	Remarks
Instruction manual	1	
Shielding Cap	1	

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