

# ***Insertion/Return Loss Tester***

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**[SM with Color display]**

**User manual ( V1.1 )**

**2015-3**

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## 1 Insertion Loss measurement

### 1-1 Turn On the Unit

Connecting 220V alternating current, after opening the panel power switch, the display will show the boot interface.

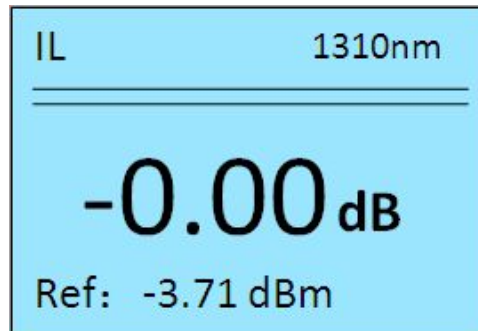
### 1-2 Insertion loss record reference ( Zero )

Press "MODE" key, switch to the single wavelength insertion loss measurement interface ( The initial wavelength 1310nm ) ①, as 1-2-1 picture.



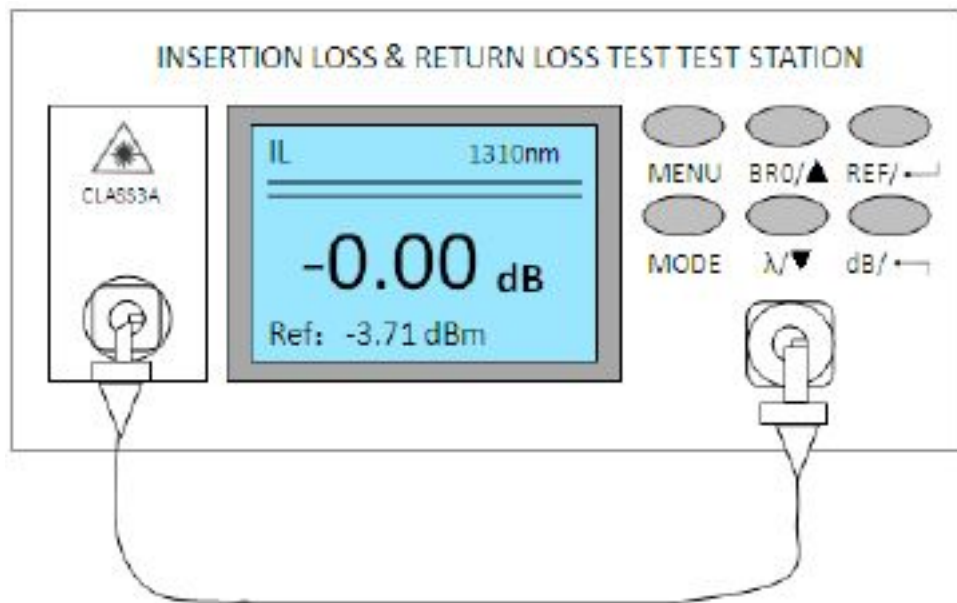
**图 1-2-1 Single wavelength Insertion loss measurement interface**

Selecting FC/APC—FC/APC calibration patchcord②, Connect starting end of the calibration patch cord FC/APC to the port of the light source( left port) and insert the other end (terminating end) of the calibration patch cord to the detector port. Press "REF/←" key to make zero, there will be -0.00dB on the LCD, the zero operation of 1310nm is finished. Then press "λ/▼" key to switch 1550nm, press "REF/←" key to make zero operation, there will be -0.00dB on the LCD. The zero operation of 1550nm finished. ③, as 1-2-2 picture



**图 1-2-2 after zero process of IL display**

Operation as following pic 1-2-3



**1-2-3**

Note : ①Zero of Insertion loss have to be made in the Insertion loss measurement with single wavelength

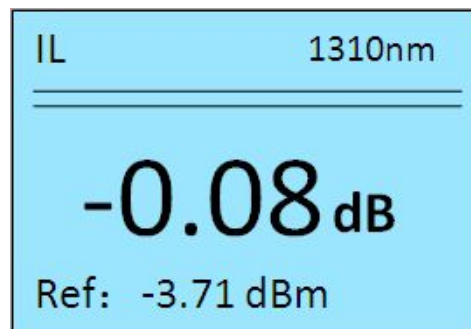
②according to the measured patchcord to Select the calibration patch cord , But the connector have to be FC/APC which connect with Light source output port.

③After finishing the zero process, pls do not take out of the connector which insert the light source port, if not, the measurement result will be error.

### **1-3 Insertion Loss measurement**

Cleaning the measured patchcord , connecting the calibration patchcord and measured patchcord with adapter , insert the other end of

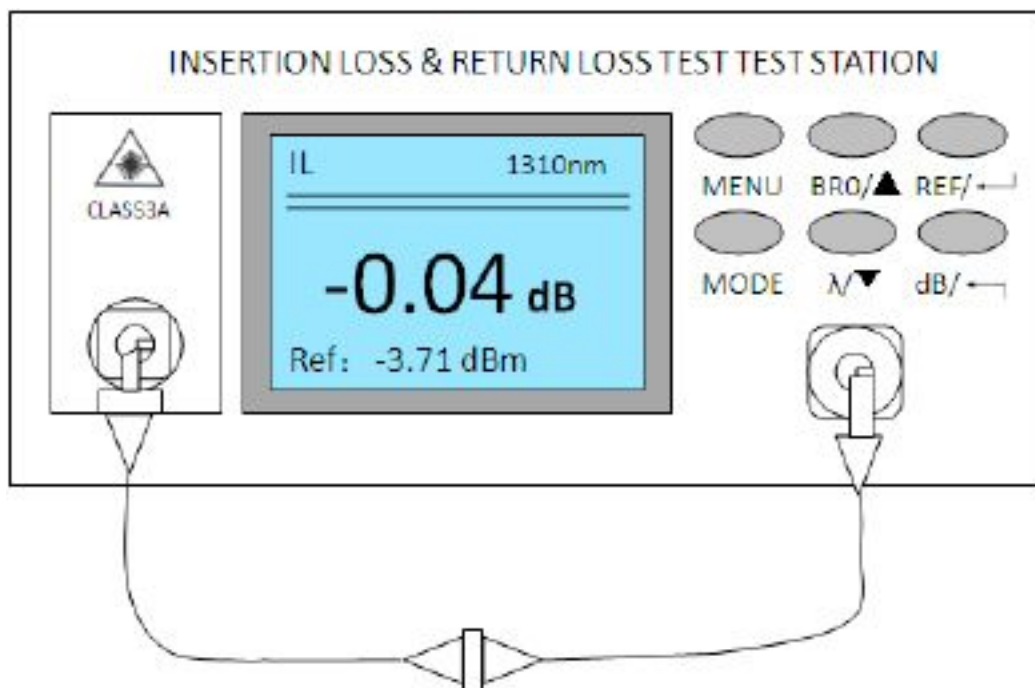
the measured patchcord to the detector of the device, the measured result of Insertion loss showed on the display. As 1-3-1



**图 1-3-1 the measured insertion loss**

Press  $\lambda/\nabla$  key to select the wavelength , and check the Insertion loss of corresponding wavelength.

Operation instruction as pic 1-3-2



### **1-3-2 Insertion loss measurement Operation instruction**

Note : ④ If the port of the measurement patch cord is **APC**, then choose the APC-APC, If it is PC, then choose APC-PC. The wrong connection of the connector may destroy the calibration patchcord connector, that will

make wrong test result.⑤ If we want to get the correct insertion loss of the measurement, pls make zero process in advance of responding wavelength.

## 2 Return Loss Measurement

### 2-1 Turn on the Unit

Connecting the 220V alternating current , turn on the unit , there will be display on the screen.

### 2-2 Return loss of zero process

Press **“MODE”** key , switch the sigle wavelength to the return loss measurement interface ( original wavelength1310nm ), as 2-2-1

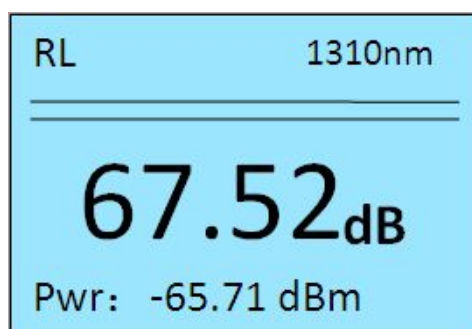
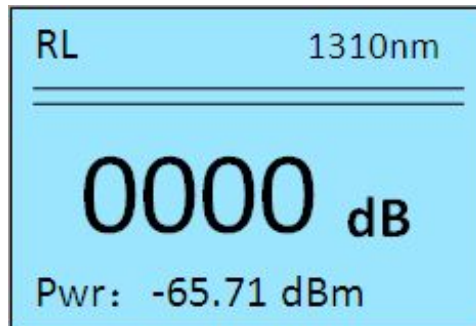


图 2-2-1 single wavelength Return loss measurement

Selecting a calibration patchcord FC/APC—FC/APC , after cleaning the connectors of calibration patchcord, connect FC/APC port to the laser souce port of the equipment ( left port ) , wrap the other end (terminating end) of the calibration patch cord with winding rod⑧, wrapping 5~6 circles of the cable to try to avoid the reflection of the light source. Pls check the **“Pwr”** value, with the winding falling , when the value is down to -65dBm or below ,long press **“BR0/▲”** key ,the “0000dB”will be shown on the display ( If the value of the SM is more than -45dBm , Multi-mode more than -30dBm , long press **“BR0/▲”** key with no

function )

As pic 2-2-2.

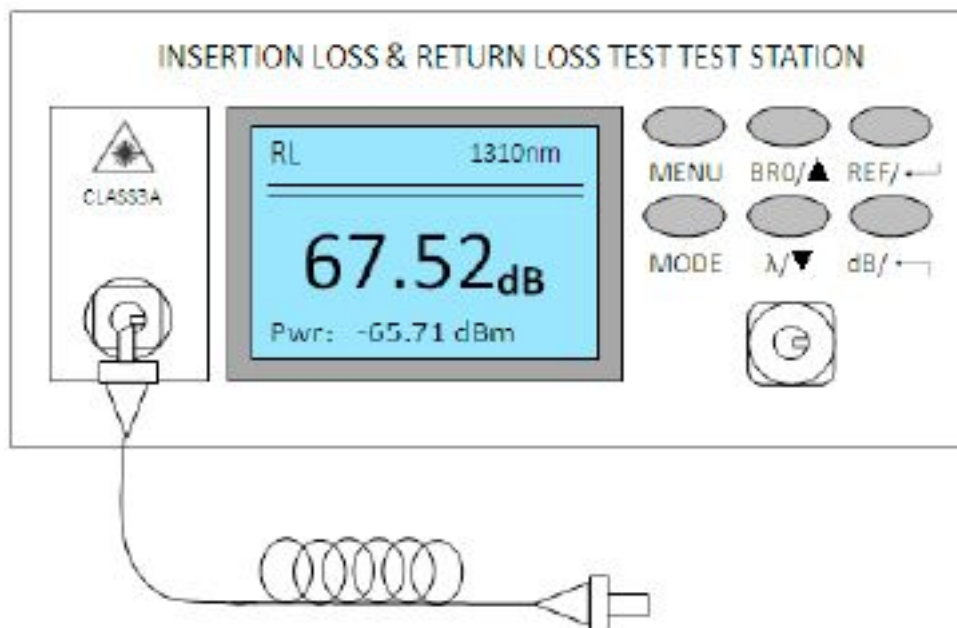


2-2-2 long press "BR0/▲"key interface

Then make the winding cable to be straight , connect with detector port of the equipment ( right port ) . Press "REF/↵" key to record the reference value , at this moment there is not **0000dB** on the display. The setting of reference value of return loss of 1310nm wavelength finished.


⑨ Press "λ/▼" key to switch 1550nm wavelength , the setting of reference value is the same as 1310nm wavelength⑩

Operation as 2-2-3 pic



### 图 2-2-3 setting reference value of return loss

Note : ⑥The setting of reference value of Return loss only operated in the single wavelength mode.

- ⑦According to the measured patchcord connector type , select corresponding calibration patchcord, but connect with equipment of laser source port should be FC/APC connector.
- ⑧If there is no winding rod , the metal rod of Screw knife could be instead.
- ⑨after finish setting reference value , the return loss of calibration patch in the air ( air index ) is during  $14.8 \pm 5\text{dB}$  , long press “**REF/**  **+MODE**” for 3~4seconds , the standard value will be 14.8dB in the air.
- ⑩after finish setting reference value of return loss , connect FC/APC port to the laser source port of the equipment , pls do not take off it, if not, the measurement result will be error.

### 2-3 Return Loss measurement

Clean the measured patchcord , connect calibration patchcord and measured patchcord with adapter ⑩ , the other end of measured patchcord with winding rod to wrap 5~6 circles which is near the adapter , check the data on the centre display , it is the return loss of the measured patchcord⑪。 As the pic 2-3-1

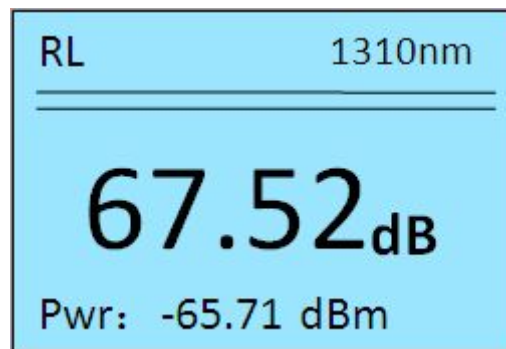
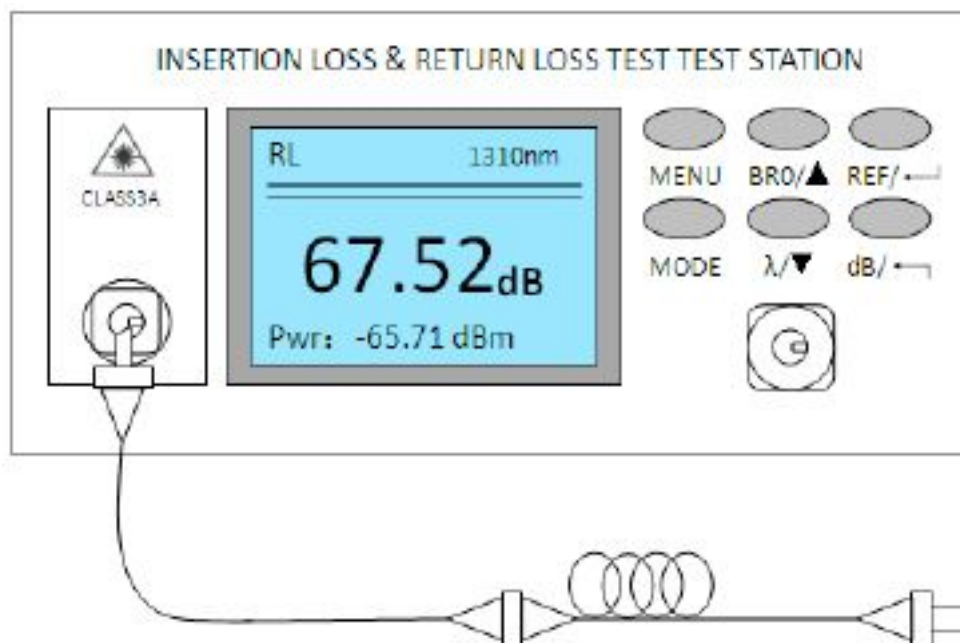


图 2-3-1Test result of return loss interface

Press “**λ/ ▼**” key to switch wavelength , check the return loss of corresponding wavelength on the display⑫.



Operation as the pic2-3-2



**图 2-3-2 Return loss operation instruction**

Note : ⑩ APC connect with APC connector , PC connect with PC connector. The unmatched connectors in connecting , which will destroy the connector of calibration patchcord , and could not get the correct test result.

⑪ the data is beyond 65dB of APC connector which is qualified , PC is beyond 50dB.

⑫ If you want to get the correct return loss of corresponding wavelength , you have to set reference value of the corresponding wavelength before the measurement operation.

### **3 Insertion Loss / Return Loss measurement at the same time**

#### **3-1 Turn on the Unit**

Connecting the 220V alternating current , turn on the switch on the rear panel, there will be display on the screen.

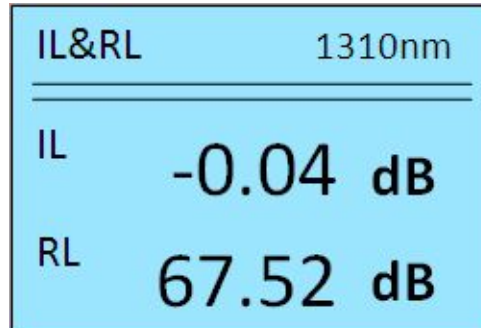
### 3-2 Make a record of reference value ( make zero of Insertion loss and reference value of return loss)

Make zero of insertion loss and reference value of return loss, pls reference the above operation instruction of separate insertion loss and separate return loss measurement<sup>⑬</sup>

Note : <sup>⑬</sup>make zero and setting reference value with no special sequence.

### 3-3 Single wavelength of Insertion loss and return loss measurement in one time

**Press" MODE" key** , switch to single wavelength of insertion loss measurement interface , as the pic 3-3



**图 3-3 Single wavelength of Insertion loss and return loss measurement interface in one time**

The insertion loss and return loss measurement operation in one time is the same as Single wavelength of insertion loss and return loss measurement operation in separation , " IL" is insertion loss of measured patchcord on the screen , " RL" is return loss of measured patchcord on the screen.

Press " $\lambda/\nabla$ " key to switch wavelength to check the insertion loss and return loss of the other wavelength<sup>⑭</sup>

Note : <sup>⑭</sup>If you want to get the correct test result , you have to set reference value of the corresponding wavelength before the measurement operation.

### 3-4 Dual wavelength of Insertion loss and return loss measurement in one

Press "MODE"key to switch the dual wavelength of insertion loss and return loss measurement interface , as pic 3-4

	1310nm	1550nm
IL	0.04dB	0.02dB
RL	67.82dB	66.43dB

### 3-4 Dual wavelength of Insertion and return loss measurement

Dual wavelength of Insertion loss and return loss measurement operation is the same as single wavelength of insertion loss and return loss measurement operation , " IL" is insertion loss of measured patchcord with 1310/1550 on the screen , " RL" is return loss of measured patchcord with 1310/1550.

## 4 the Output light source and optical power measurement

### 4-1 Turn On the unit

Connecting the 220V alternating current , turn on the unit , there will be display on the screen.

### 4-2 Output light source

Press "MODE" key , switch to **OPM** interface ( original wavelength 1310nm ) , as pic 4-2-1

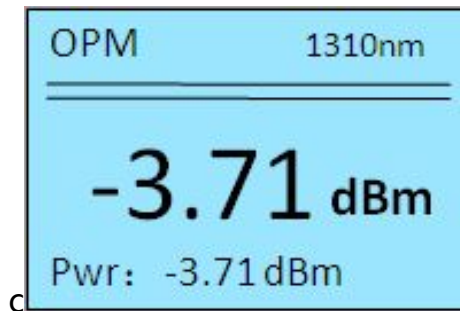
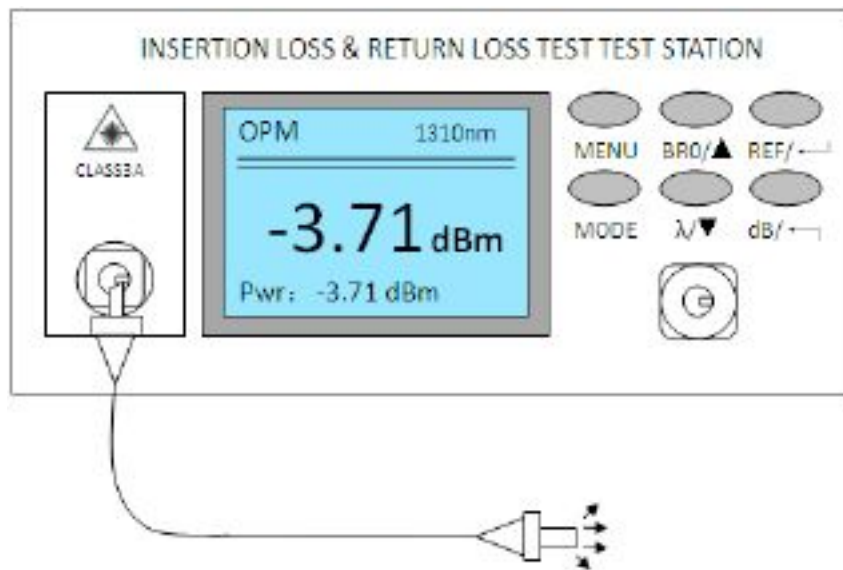


图 4-2-1 OPM measurement interface

Press " $\lambda/\nabla$ " key , switch the measured wavelength. When the wavelength is 1310 and 1550nm , there will be light source of 1310 and 1550nm from the light source port. When we switch to the other wavelength ( 1490/850/1300/1625nm ) , there will be no light source from the light source port.. As 4-2-2



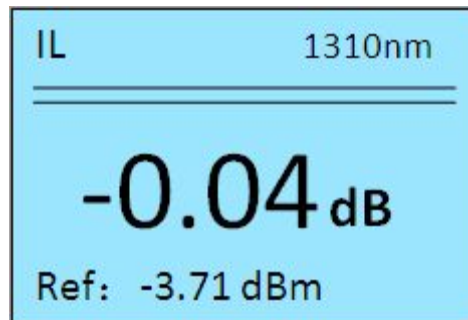
4-2-2 Output Light source picture

### 4-3 Optical power measurement

Press "MODE" key , switch to **OPM interface** ( original wavelength 1310nm )

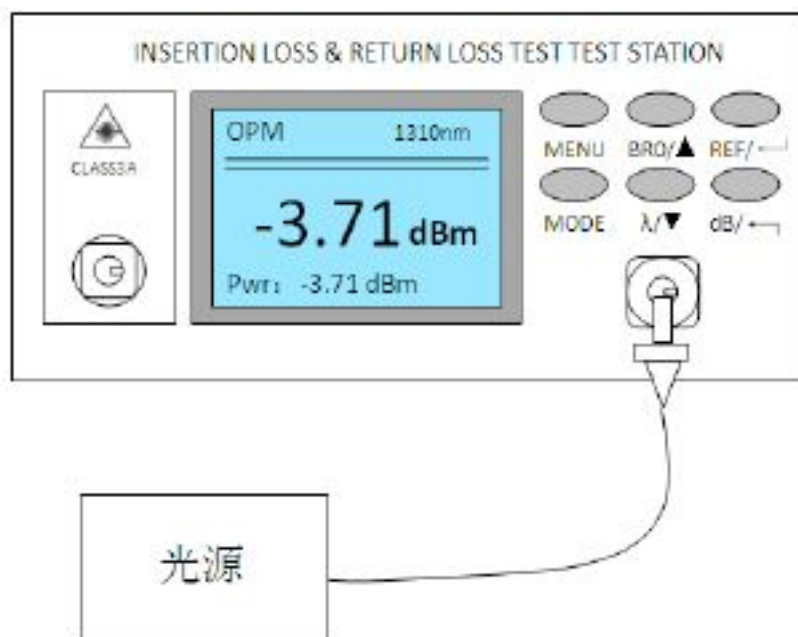
Connect light source with detector of the equipment ( right port ) , there will be data to show the current optical power value ( dBm ) , press

“dB/←” key to switch the display method ( absolute optical power value or relative optical power value ) as pic 4-3-1



#### 4-3-1 relative optical power

Press “λ/▼” key to switch the wavelength of optical power measurement connecting of the optical power measurement as pic 4-3-2



#### 4-3-2 Optical power measurement