

FOREWORD

This manual is applicable to **series SNMP network control port 1310nm** AM direct modulation optical transmitter. Mainly expatiate the product's function characteristics, technique parameters, installation and debugging. For insuring the equipment can be successfully installed and safely work, please carefully read the manual before using it, and proceed it strictly according to the prescriptive operation steps of manual for installation and debugging, in order to preventing equipment or operator to unnecessary damage or harm. If there is question, please contact with our company timely.

Special Notice:

1. The optical transmitter is slap-up professional equipment, and its installation and debugging must be operated by special technician. User should read this manual before operating to prevent damaging the equipment by fault operation or harming to human's body.
2. There is invisible laser bean from Fiber output, which direct shining at eye will cause permanence burn.
3. Earthing first before turning on the power and being sure that the rack mount and the outlet earth well (Earthing resistance should be less than 4Ω), prevent to damaging the laser by static and harming user.
4. For insuring equipment can stable work of long-term, in voltage unsteady or voltage wave bad region, suggestion equipping the appropriation AC manostat power, even UPS. In the environment temperature bad variety (the equipment's suitable work environment temperature is $25\text{ }^{\circ}\text{C}$) region, suggestion to install air-condition for the ameliorative work environment of the equipment.

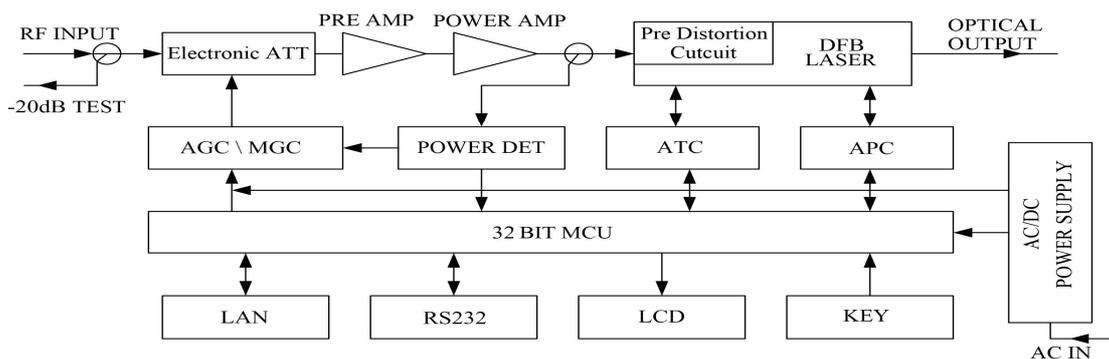
1. Product Summary

Series laser transmitters are important equipments to set up CATV HFC networks, and primarily used for TV video signal, digital TV signal, telephone voice signal and data (or compressed data) signal long-distance fiber transmission. The product use import high performance DFB laser transmitter as light source, RF drive adopts RF power digital automatic process technique and advanced RF pre-distortion circuit developed by our company and built-in perfect microprocessor automatic monitor system insure the excellent function of the product.

2. Function Characteristics

1. Use the international famous brand high performance DFB laser with narrow spectrum, good linearity and high output power.
2. RF drive adopting RF power digital automatic process technique, can according to level of input RF signal and number of channels (15-84channels), automatically processing drive level power, making the C/N, CTB and CSO always in best worth, insure product function; and be steady of output level.
3. Advance multi-frequency RF pre-distortion technique with arsenide kalium component availably improves CTB and CSO, the most important parameter of CATV, and heightens C/N at the same time.
4. Built-in perfect microprocessor automatic monitor circuit can real-time accurately monitor optical output power and temperature of the laser insure stable optical output power, and prolongs work life of the laser availably.
5. Built-in blue VFD monitor on front panel can accurately display the equipment's each work status parameter.
6. 19"1U height standard rack mount, equipped standard IEEE802.3 10Base-T Ethernet network port and RS232 network port, can expediently realizes monitor through network.
7. Support GB/T 20030-2005HFC Network control management

3. Principle Drawing



4. Technique Parameter

4.1 Link path test condition

Special elucidation: Equipments technique parameter the manual given is according to the test method of GY/T143-2000 *CATV system amplitude modulation laser transmitter and receiver enter the net technique condition and measure method*, and gained under its prescriptive test condition.

Test condition:

Test link path is formed of standard fiber and standard optical receiver. Under the condition of

prescriptive link loss, set 84 PAL-D imitate TV channels signal at 750MHz, when optical receiver input optical power being -1dBm, measure C/ CTB, C/ CSO, C/ N.

4.2 Technique Parameter Table

Item	Unit	Technique Parameter									
Optical Power	mW	4	6	8	10	12	14	16	18	20	22
Optical Link Path Loss	dB	7	9	10	11	11.8	12.5	13	13.6	14	14.4
Optical Wave Length	Nm	1310±20									
Type of Laser		DFB									
Optical modulation mode		Direct Optical Intension modulation									
Optical connector Type		FC/APC, SC/APC									
Frequency Range	MHz	47-750/862									
RF Input Level	dBuV	72-88									
Flatness In Band	dB	±0.75									
RF Input Impedance	Ω	75									
Input Reflection Loss	dB	≥ 16 (47-550MHz); ≥ 14 (550-750/862MHz)									
C/CSO	dB	≥ 60									
C/CTB	dB	≥ 65									
C/N	dB	≥ 51									
AGC Control Range	dB	±5									
MGC Control Range	dB	0-10									
Power Voltage	V	AC 100V-250V (50Hz or 60Hz)									
Power Consumption	W	30									
Operation Temperature	□	0 -- 45									
Store Temperature	□	-20 -- +65									
Relative Humidity	%	Max 95% no condensation									
Dimension	mm	483 (L) ×380 (W) ×44 (H)									

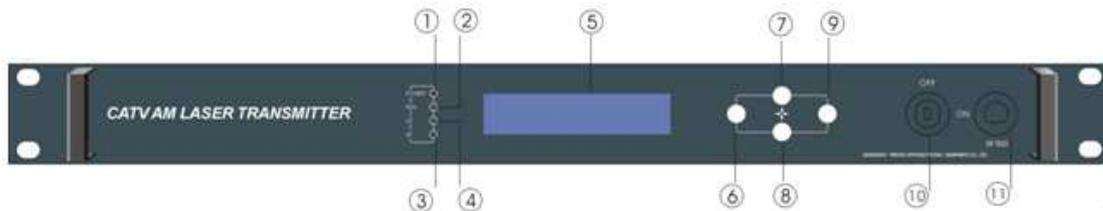
Optical Link Path C/N Parameter:

Optic power	Optical Loss (dB)														
	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
4mW	53.8	52.8	51.8	51	50.1	49.2	48.2								
6mW				53.0	52.0	51.0	50.1	49.1	48.1						
8mW					52.8	51.9	51.0	50.1	49.2	48.2					
10mW						52.9	51.9	51.0	50.1	49.1	48.2				
12mW							52.7	51.8	50.8	49.9	49.0	48.0			
14mW								52.4	51.5	50.5	49.5	48.6	47.8		
16mW									52.0	51.0	50.1	49.1	48.1		

18mW									52.5	51.6	50.6	49.7	48.7	47.9	
20mW										51.9	51.0	50.0	49.0	48.0	
22mW										52.2	51.4	50.4	49.4	48.6	47.8

5. Exterior function elucidation

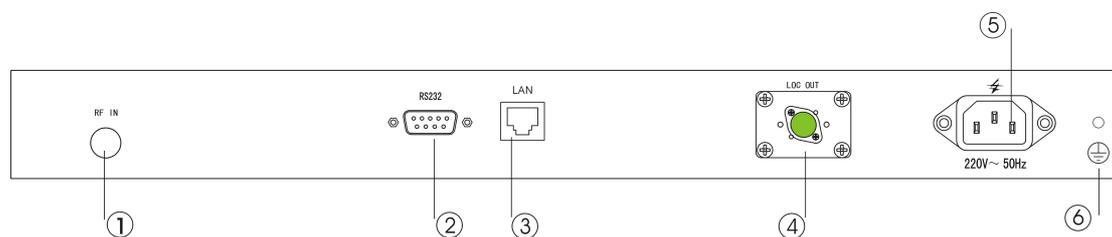
5.1 Front panel explanation



Front panel **sketch map**

1. Power indicator: when the power inside is working, the light is on.
2. Equipment operating indicator: equipment works: LED twinkles by 1Hz frequency.
3. LD laser operating status indicator: red light shows that the laser does not work and each parameter is normal; when the red light is twinkling, it shows that this equipment is at fault. The faulted reason can be looked into the alarm list of the show menu. When the green light is on, it shows that laser is working normally.
4. RF status indicator: Green light: normally work; Red light: laser abnormality.
5. The 160×32 crystal liquid display: Show the all parameter.
6. Withdraw or cancel key.
7. Up and increase key.
8. Down and decrease key.
9. Confirmation key
10. Laser switch key: Control work status of the laser. “ON” indicate laser is turn on, “OFF” indicate laser is turn off. When turn on power, the key must be OFF, after self-examine, according to the message displayed on the VFD monitor, switch the key to ON.
11. Input RF signal Test port: -20dB RF Test Port

5.2 Back panel explanation



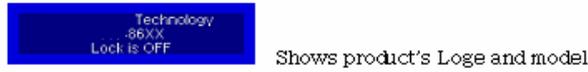
Back panel elucidation

1. RF input
2. RS232 interface: use for various network management parameter allocations.
3. LAN interface: match with IEEE802.3 10Base-T interface, use for network management.
4. Optical signal output: Optical signal output port has two interfaces: FC/APC and SC/APC. There is invisible laser beam from Fiber output when laser works, which direct shining at eye will cause permanence burn.

5. Power in
6. Shell Earthing: Connection the equipment and earth.

5.3 Display Parameter Explanation

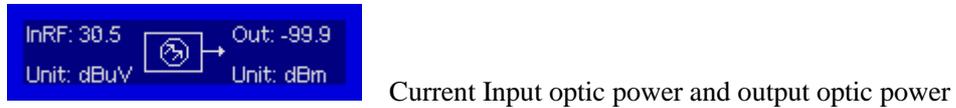
- 1) Lock is off



- 2) Lock is on



- 3) Enter the system



- 4) Push ENT key into menu



- 5) Sub-menu of parameter



Content	Function
	Laser Output
	Laser Bias
	Laser Temperature
	Tec Cooling
	RF Channel Number

Tec Cooling: 0.00 A RF Channel Number: 84 Input RF: 30.4 dBuV	Input RF
RF Channel Number: 84 Input RF: 30.7 dBuV RF Control Mode: AGC	RF Control Mode
Input RF: 30.5 dBuV RF Control Mode: AGC AGC Ref: +0 dB	AGC Ref
Input RF: 30.7 dBuV RF Control Mode: MGC MGC ATT: 3 dB	MGC ATT
RF Control Mode: AGC AGC Ref: +0 dB +5V Read: 5.00 V	+5V Read
AGC Ref: +0 dB +5V Read: 5.00 V -5V Read: 4.90 V	-5V Read
+5V Read: 5.00 V -5V Read: 4.91 V +24V Read: 0.00 V	+24V Read
-5V Read: 4.90 V +24V Read: 0.00 V S/N: 12345678	S/N
+24V Read: 0.00 V S/N: 12345678 Box Temperature: 19.2 °C	Box Temperature
S/N: 061103123 Box Temperature: 25.25 °C IP Address: 192.168.0.97	IP Address
Box Temperature: 25.25 °C IP Address: 192.168.0.97 Subnet Mask: 255.255.255.0	Subnet Mask
IP Address: 192.168.0.97 Subnet Mask: 255.255.255.0 Net Gateway: 192.168.0.1	Net Gateway
Subnet Mask: 255.255.255.0 Net Gateway: 192.168.0.1 Mac: 00-03-b9-88-10-11	Mac
Net Gateway: 192.168.0.1 Mac: 00-03-b9-88-10-11 Software Version: 3.00	Software Version

6) Setting menu

- 1. Disp Parameters
- 2. Set Parameters
- 3. Alarm Status

Push ENT key into menu

Content	Function
Set Laser Output Unit Set Buzzer Alarm Set RF Control Mode	Set Laser Output Unit
Set Laser Output Unit Set Buzzer Alarm Set RF Control Mode	Set Buzzer Alarm
Set Laser Output Unit Set Buzzer Alarm Set RF Control Mode	Set RF Control Mode: AGC or MGC
Set Buzzer Alarm Set RF Control Mode Set MGC ATT	Set MGC ATT
Set Buzzer Alarm Set RF Control Mode Set AGC Ref	Set AGC Ref
Set RF Control Mode Set MGC ATT Set Channel Number	Set Channel Number
Set MGC ATT Set Channel Number Set RF Input Low Alarm	Set RF Input Low Alarm
Set Channel Number Set RF Input Low Alarm Set RF Input High Alarm	Set RF Input High Alarm
Set RF Input Low Alarm Set RF Input High Alarm Set Laser Output Low Alarm	Set Laser Output Low Alarm
Set RF Input High Alarm Set Laser Output Low Alarm Set Laser Output High Alarm	Set Laser Output High Alarm
Set Laser Output Low Alarm Set Laser Output High Alarm Set Laser Temp Low Alarm	Set Laser Temp Low Alarm
Set Laser Output High Alarm Set Laser Temp Low Alarm Set Laser Temp High Alarm	Set Laser Temp High Alarm

Set Laser Temp Low Alarm Set Laser Temp High Alarm Set +5V Low Alarm	Set +5V Low Alarm
Set Laser Temp High Alarm Set +5V Low Alarm Set +5V High Alarm	Set +5V High Alarm
Set +5V Low Alarm Set +5V High Alarm Set -5V Low Alarm	Set -5V Low Alarm
Set +5V High Alarm Set -5V Low Alarm Set -5V High Alarm	Set -5V High Alarm
Set -5V Low Alarm Set -5V High Alarm Set +24V Low Alarm	Set +24V Low Alarm
Set -5V High Alarm Set +24V Low Alarm Set +24V High Alarm	Set +24V High Alarm
Set +24V Low Alarm Set +24V High Alarm Set Local IP Address	Set Local IP Address
Set +24V High Alarm Set Local IP Address Set Subnet Mask	Set Subnet Mask
Set Local IP Address Set Subnet Mask Set Gateway	Set Gateway
Set Subnet Mask Set Gateway Restore Factory Config	Restore Factory Config

7) Alarm menu



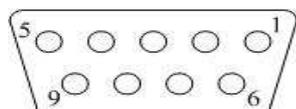
Push ENT key into menu

6. Network controlling management explanation

6.1 interface explanation

1) RS232 communication connector

Adopt DB9 standard connector



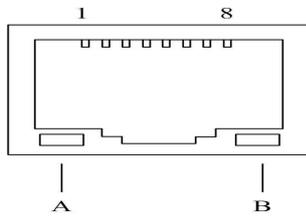
1 : No Connect 2 : TX 3 : RX 4 : No Connect 5 : GND

6 : No Connect 7 : No Connect 8 : No Connect 9 : No Connect

The serial communication uses the standard NRZ form, 1 start figure, 8 data figure, 1 stop figure and the baud rate is 38400.

2) communication interfac

The LAN communication uses the RJ45 standard port as the connector.



1 : TX+ 2 : TX- 3 : RX+ 4 : No Connect

5 : No Connect 6 : RX- 7 : No Connect 8 : No Connect

A: green light: when it is twinkling, LAN port is sending the data.

B: yellow light: when the light is on, the network is normal.

6.2 Set up the super terminal

If you do not setup the super terminal, follow the steps.

1. Click “start menu →program→ accessory→communication→super terminal”;
2. Display the page:



(Fig.2)

Then you input your connector name, such as “SNMP38400” , and choose the serial port to connect with your equipment. As follows;



(Fig. 3)

Push the “OK” button; show the allocation page of serial port. As follows;

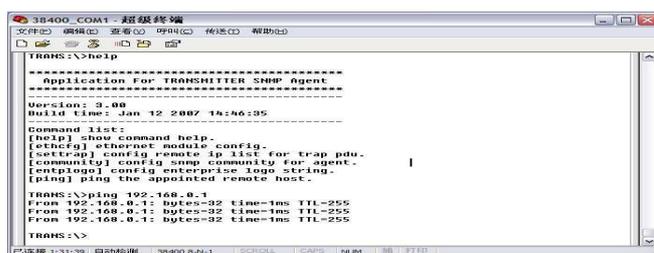
This order configures the read-only group name and read-write group name. “Group name” is the concept of SNMP agreement like the password. Use the order “community ro” to configure the read-only, and “community rw” for the read-write. For example, input “community rw public” , “public” is the read-write group name.

entplogo

This order modifies the product’s LOGO information which is the model number series of factory showed in display . This product permit to configure two LOGO character, the max length is 31byte, which displays in the first line and second line of the crystal liquid screen. Use the order “entplogo -1 xxxx” to configure the first line LOGO, and the second line uses the “entplogo -2 xxxx”. Xxxx is the LOGO character sting. The spaces of the xxxx must be used the underline “_”, otherwise, the order is failed.

Ping

This order tests the connecting status between the equipment’s LAN port and network. (Picture 11) testing equipment and IP address is: 192.168.0. 1 router connecting status, the order is “ping 192.168.0.1”.



(Fig.11)

7. Installation and Debugging

7.1 Unpack and Check

1. Insure the package not is defaced. If have any damnification or water mark, please contact local franchiser or conveyancer.
2. After unpacking, check equipments and accessories according to package list. Any question, please contact local franchiser or our company.
3. If you think equipment has been damaged, please don't electrify avoid worse damage. Please contact local franchiser or our company.

7.2 Instruments and tools

An optical power meter

A digital multimeter

A standard fiber test jumper (FC/APC or SC/APC)

Some waterless alcohol and nosocomial degrease cotton

7.3 Installation steps

1. Before installing the equipment, please read the operation manual carefully and install the equipment according to the operation manual. Notice: install the equipment is not according to the operation manual, which leads to man-made faults and other results, our company will not take the responsibilities and the service of free fix.
2. Fix equipment on rack mount and earthing. (earthing resistance < 4Ω) .

3. Check voltage by digital multimeter whether accord with requirement and to be sure laser lock is OFF. Then turn on power.
4. Connect RF signal and turn key to ON, till laser work LD turns to green, then the equipment began to work. This time you can push STATUS keys on front panel to watch parameters.
5. Connect optical power meter to optical output of the equipment with a standard test jumper, then measure optical output power, affirm optical output power is same to value shown on front panel;(when test the optic power, ensuring the optic power is within 1310nm. Ensure fiber test jumper is standard fiber test jumper, and each active Connector is not polluted), remove standard fiber test jumper and optical power meter; connect the equipment to network. The equipment has been installed.

8. FAQ

Breakdown phenomena	Breakdown cause	Resolve method
After turn on the power, VFD monitor and LED no display.	Switch power can't normal start, equipment DC power supply abnormal.	Check power supply whether normal(~AC160V~250V) , if power voltage normal, maybe switch power module fault, contact franchises or our company.
After turn on the power, VFD monitor no display, but power LED is on.	Micro-processor doesn't work.	Please contact with the dealer or our company.
After turn on the power, output optical power displayed on the front panel and laser status LED normal, but real tested output power on the low side	<ol style="list-style-type: none"> 1. Test jumper quality not good 2. Optical active connector or adapter maybe polluted 3. China tube in adapter maybe damaged 	<ol style="list-style-type: none"> 1. Change good test jumper. 2. Clean polluted fiber active connector or adapter. Detailed operation method refers to "optical fiber active connector clean and maintenance method". 3.Change damaged adapter
After connecting to network, figure of optical connector has obvious netlines or big optical point	<ol style="list-style-type: none"> 1. Receive optical power at optical connector too high, result in output level of optical receive module too high, RF signal inter-modulation index become worse 2. RF signal of input optical transmitter higher than the AGC control range, result in inter-modulation index become worse. 3. Inter-modulation index of input optical transmitter RF signal in originally bad. 	<ol style="list-style-type: none"> 1. Check optical receive power of optical connector and adjust properly 2. Check input level of optical transmitter RF signal and adjust to the range that equipment required.(Right RF input level is 72-88BuV) 3. Check inter-modulation index of input optical transmitter RF signal

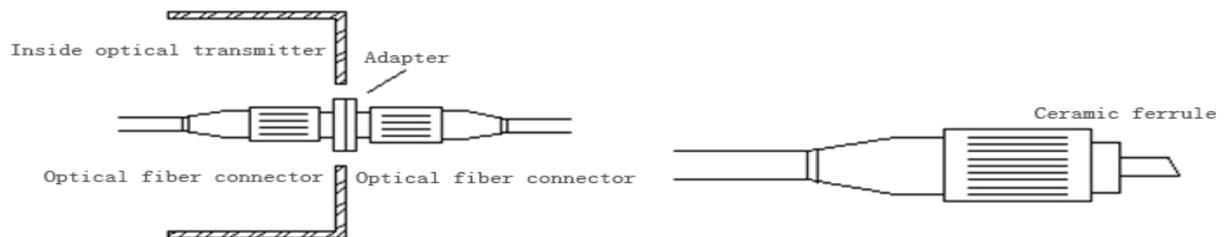
<p>After connecting to network, figure of optical connector has obvious noise point</p>	<ol style="list-style-type: none"> 1. Optical connector receive optical power not enough cause C/N drop 2. RF signal level of input optical transmitter too low, result in laser modulation depth not enough. 3. System link path C/N too low 	<ol style="list-style-type: none"> 1. Clean fiber active connector or adapter to resume optical connector receives optical power. Detailed operation method refer to “optical fiber active connector clean and maintenance method” 2. Check RF signal level of input optical transmitter and adjust to the range that equipment required(72-88dBuV). When number of input channel less than 15, setup NGC control mode 3. Check C/N of system link with frequency analysis instrument and adjust properly to insure C/N of link signal higher than 51dB
<p>After connecting to network, figure of some optical connector channel has obvious noise point or ripple</p>	<p>There’s open circuit interfere or strong interfere signal invade in optical connector.</p>	<ol style="list-style-type: none"> 1. Check whether there’s strong signal origin at optical connector’s place to avoid strong interfere signal origin. Check cable road below optical connector whether there’s shielded net or bad shield of RF connector 3. Close the machine shell to insure good shield. If possible, set shielded cover at optical connector and earthing the shielded cover
<p>After connecting to network, figure of some optical connector channel has obvious noise point</p>	<p>C/N ratio index of some channels too low</p>	<p>Check C/N ratio of the channel signal and do some proper adjustment.</p>
<p>After connecting to network, figure of some optical connector have one or two level rolling road</p>	<p>Interference of power alternating current wave caused by bad equipment earthing or power earthing</p>	<p>Check equipment’s earthing, insure every equipment good earthing and earthing resistance <4Ω.</p>
<p>After connecting to network, receive optical power at optical connector not stand with big change. Output RF signal is also not stand, but output optical power is normal</p>	<ol style="list-style-type: none"> 1. Optical fiber active connector wrong matched. Maybe APC connector match PC connector, result in optical signal can’t transmit normally. Optical active connector or adapters were badly polluted, or adapter was damaged. 	<ol style="list-style-type: none"> 1. Check type of optical fiber active connector, choose APC connector to insure optical signal transmit normally. 2. Wash polluted optical active connector or adapter. Detailed operation method refers to optical fiber active connector clean and maintenance method.

9. Service

- a) Our company's promises: Guarantee for thirteen month (start from the production date showed on S/N), fix all the life. Equipment at fault is resulted from the users' improperly operation and unavoidable environment reasons, our company will fix, but collect suitable material cost.
- b) If the equipment at fault, immediately contact local distributor or our company customer service centre.
- c) Equipment at fault locale fix must be operated by special technician, avoid worse damage.
- d) Special caution: if the user has fixed the equipment, our company will stop the service of free fix. But we will fix it, and you must pay for the cost of fix and material.

The clean and maintenance method of the head of fiber active connector

During the optical equipment using, each fiber active maybe polluted by dust or dirt, result in optical link path loss increasing. If optical receive power and output level of the receiver decline, you should clean and maintain fiber active connector. Introduce some clean methods:



- Carefully screw off fiber active connector from the adapter avoids the fiber active connector with laser to aim at the human body or eye result in harm the body.
- Use nosocomial degrease alcohol cotton to wash carefully, after finish, still need to be waited 1~2 minutes, let the active connector surface dry in the air.
- Cleaned optical active connector should be connected to optical power meter to measure out optical power, affirmed if it has been cleaned.
- When the cleaned optical active connector screwed back to adapter, should notice to make force appropriate to avoid china tube in the adapter crack.
- The fiber active connector should be cleaned in pairs. If optical power is on the low side after clean, the adapter may be polluted, clean it.
- Use compressed air or degrease alcohol cotton to wash the adapter carefully. When use compressed air, the muzzle aims at china tube of the adapter, clean the china tube with compressed air. When use degrease alcohol cotton, insert directions need be consistent, otherwise can't reach a good clean effect.

Special notice:

a. In the process of clean the fiber optic active connector, you should avoid direct shining at eye, which will cause permanence burn!!!!

b. Use proper energy to install the fiber optic active connector, or the ceramic tape in the adaptor will lead to break. Once the ceramic tape is broken, the output optical power will decrease rapidly. If you turn the fiber optic active connector slightly, the output optical power changes

obviously.

c. Please operate the optical fiber under the condition of close the pump laser. Or the big output power will lead to burn the joint of the output optical fiber, which will reduce the output power.