

EDFA 27 dB 1 out

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COMCAST GROUP



Content

Foreword	4
Application.....	5
2. Performance Characteristics.....	5
3. Block diagram	5
4. Technique Parameter	6
4.1 Technique Parameter	6
5. External Function Description.....	8
5.1 Front Panel Description.....	8
5.2 Rear Panel Description.....	9
5.2.1 DC Power Module Introduction	9
6. Menu System	10
6.1 Main Menu.....	10
6.2 Display Menu.....	11
6.3 Setup Menu	13
6.4 Warning menu.....	14
7. Communication Setup Descriptions.....	15
7.1 Communication Interface Description.....	15
8.1 Unpack and Check	18
8.2 Instruments and tools.....	18
8.3 Installation steps.....	18
9. Clean and maintenance method of the optical fiber active connector	18
10. After-sales Service Description	20
11. Disclaimer	20

Foreword

This manual applies to Fiber Amplifier. It mainly describes the performance characteristics, technical parameters, installation and debugging, common troubleshooting, and other related content of the product. In order to ensure that the equipment can be successfully installed and safely operated, please read this manual carefully before installing and debugging the equipment. And the installation and debugging should be strictly according to the specified steps on the manual to avoid unnecessary damage to equipment or accident harm to the operator. Any questions, please contact with us in time.

Special Tips:

- Er Yb Codoped Fiber Amplifier is high end professional equipment, and its installation and debugging must be operated by special technician. Read this manual carefully before operating to avoid damage to equipment caused by fault operation or accident harm to the operator.
- While the fiber amplifier is working, there is an invisible laser beam from the optical output adapter on the front panel. Avoiding permanent harm to the body and eye, the optical output should not aim at the human body and human should not look directly at the optical output with the naked eye!
- Please make sure that the ground terminal of the case and power outlet has been reliably grounding before turning on the power (Grounding resistance should be $< 4\Omega$) to prevent the static damage the pump laser device and harm to human because of case charged.
- To ensure the equipment can work stable over a long time, in voltage unsteady or poor voltage wave region, it's recommend to the customer that he equips special AC regulated power supply, or even AC uninterrupt power supply (UPS) system for conditional users. In the region with large temperature variation environment (The equipment's ideal work environment temperature is 25°C) or bad room environment, it's recommend to the customer that he equips special air-condition system to improve the work environment.

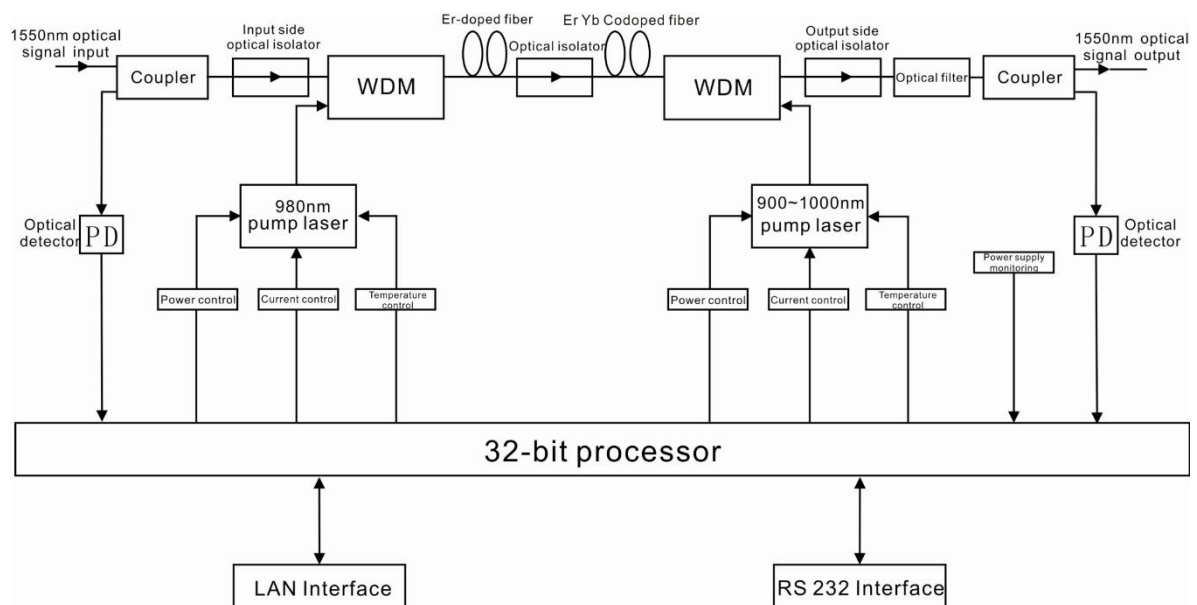
Application

- Single-mode fiber 1550 amplification network
- FTTH network
- CATV network

2. Performance Characteristics

- Adopts Er Yb Codoped double-clad fiber technology;
- Optical output power: output up to 27dBm;
- Low noise figure: <5dB when input is 0dBm;
- Perfect network management interface, in line with standard SNMP network management;
- Intelligent temperature control system make the power consumption lower;

3. Block diagram



4. Technique Parameter

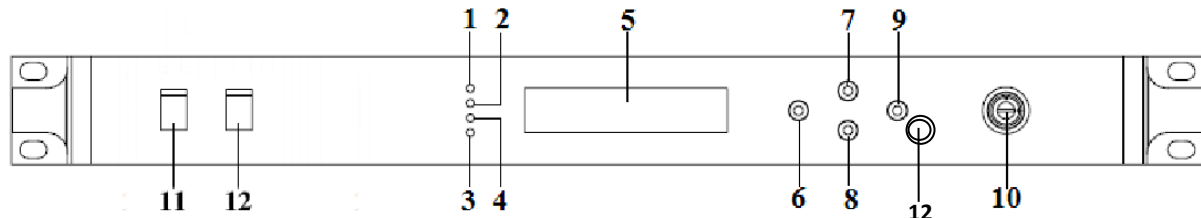
4.1 Technique Parameter

Item	Unit	Technique parameters	Remark
Operating bandwidth	nm	1530 - 1560	
Optical input power range	dBm	-3 - +10	max:-10~+10
optical output power range	dBm	24~27	
Output power stability	dBm	±0.5	
Noise figure	dB	≤ 5.0	Optical input power 0dBm, λ=1550nm
Return loss	Input	dB	≥ 45
	Output	dB	≥ 45
Optical Connector Type		SC/APC	
C/N	dB	≥ 50	Test condition according to GT/T 184-2002.
C/CTB	dB	≥ 63	
C/CSO	dB	≥ 63	
Power supply voltage	V	A: AC160V - 250V (50 Hz) B: DC48V	
Operating temperature range	°C	-10 - +42	
Maximum operating relative humidity	%	Max 95% no condensation	

Storage temperature range	°C	-30 - +70	
Maximum storage relative humidity	%	Max 95% no condensation	
Dimension	mm	483(L) × 460(W) × 44(H)	

5. External Function Description

5.1 Front Panel Description



Schematic diagram of the front panel

- 1) Power indicator: One switching power supply is working – yellow; two switching power supplies are working – green.
- 2) Optical input power indicator: This light turns on when the optical input power is $> -10\text{dBm}$.
- 3) Pump working status indicator: Red light means the pump is not working, but the machine parameters are normal; flashing red light means the machine has broken down, related fault reason see the alarm menu of the display menu; green light means the pump is working normal.
- 4) Optical output power indicator: This light turns on when the optical output power is $> +10\text{dBm}$.
- 5) 160×32 dot-matrix LCD screen: used to display all the parameters of the machine.
- 6) Display the exit or cancel key of the setup menu.
- 7) Display the up or increase key of the setup menu.
- 8) Display the down or decrease key of the setup menu.
- 9) Display the enter key of the setup menu.
- 10) Pump laser switching key: used to control the working status of pump laser. “ON” means the pump laser is open and “OFF” means the pump laser is closed. Ensure the key is on “OFF” position before power on. After passing self-test, rotate the key to “ON” position according to the displayed message.
- 11) Optical signal input: The default connector type is SC/APC. Other specification requirements are specified by the customer.
- 12) Optical signal Output: The default connector type is SC/APC. Other specification requirements are specified by the customer.
Warning: There is an invisible laser beam from this port while working normal. So the port should not be aligned to the human body or the naked eye to avoid accidental injury.

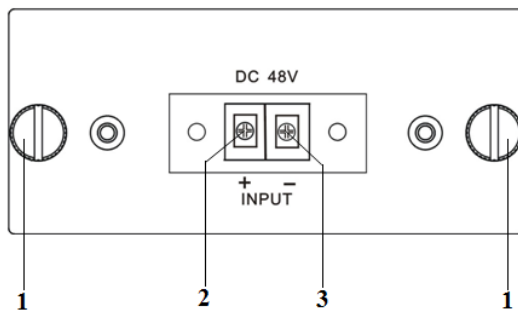
5.2 Rear Panel Description



Schematic diagram of the rear panel

- 1) Fan outlet.
- 2) RS232 interface: Used for configuring the network management parameters.
- 3) LAN interface: correspond to IEEE802.3 10Base-T, used for network management.
- 4) The AC 220V input port of power supply 1.
- 5) The fuse of power supply 1.
- 6) The switch of power supply 1.
- 7) The AC 220V input port of power supply 2.
- 8) The fuse of power supply 2.
- 9) The switch of power supply 2.
- 10) Ground stud of the chassis: used for the connection of device and ground wire.

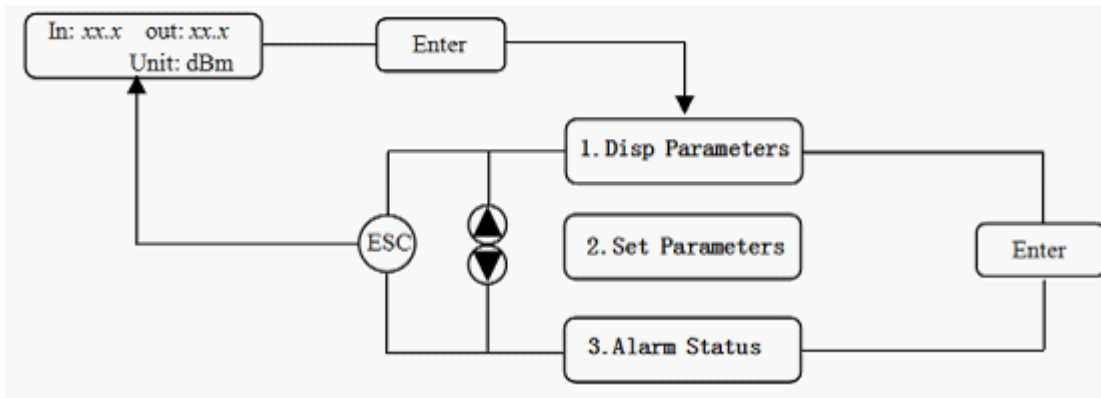
5.2.1 DC Power Module Introduction



1	Mounting screws	2	+ Positive terminal block	3	- Negative terminal block
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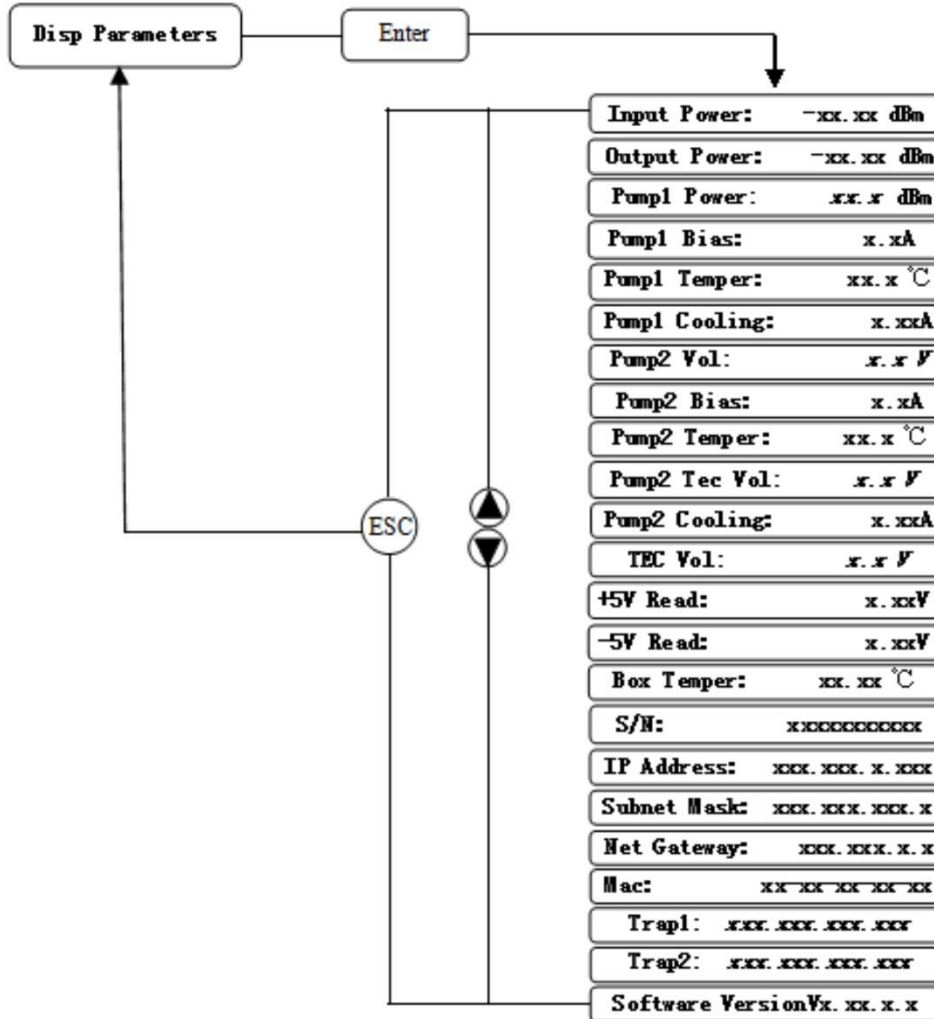
6. Menu System

6.1 Main Menu



Name	Display	Description
System Starting	xxxxxxx	Manufacturers' logo
	xxxxxxx	Equipment model
	xxxxxxx	Start countdown / lock status
Suspend Page	In: xx.x out: xx.x Unit: dBm	Display the optical input / output power
Main Page	1.Disp Parameters	Entry of parameter display menu
	2.Set Parameters	Entry of parameter setup menu
	3.Alarm Status	Entry of alarm information menu

6.2 Display Menu

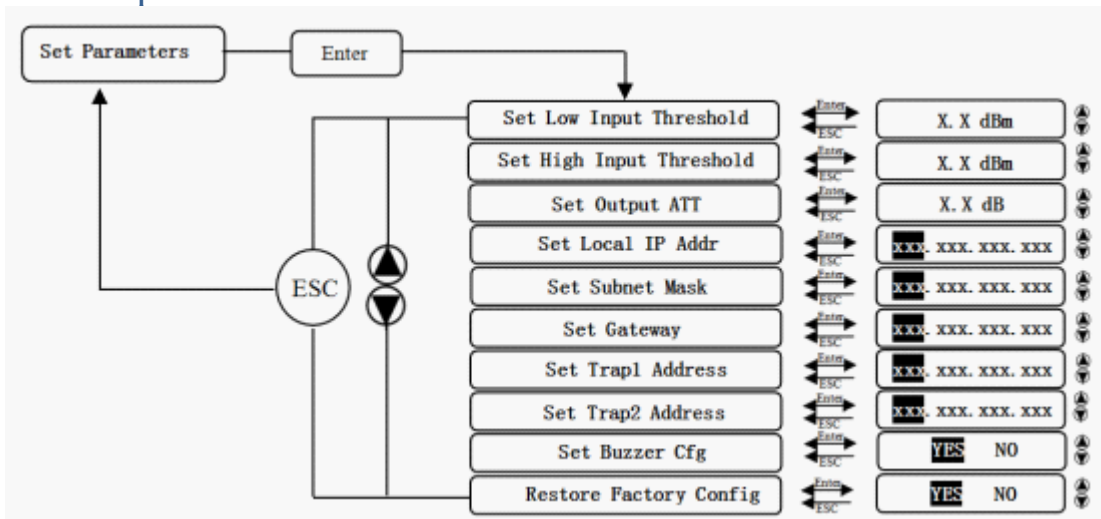


1.Disp Parameters	Input Power: xx.x dBm	Input power, accurate to 0.1 dBm
	Output Power: xx.x dBm	Output power, accurate to 0.1 dBm
	Pump1 Power: xx.x dBm	Power of pump1, accurate to 0.1 dBm
	Pump1 Bias: x.x A	Bias current of pump1, accurate to 0.1 A
	Pump1 Temper: xx.x °C	Temperature of pump1, accurate to 0.1 °C
	Pump1 Cooling: x.xx A	Cooling current of pump1, accurate to 0.01 A
	Pump2 Vol: x.x V	Drive voltage of pump2, accurate to 0.1 V

	Pump2 Bias: x.x A	Bias current of pump2, accurate to 0.1 A
	* Pump2 Temper: xx.x °C	Temperature of pump2, accurate to 0.1 °C
	* Pump2 Tec Vol: x.x V	Cooling voltage of pump2, accurate to 0.1 V
	* Pump2 Cooling: x.xx A	Cooling current of pump2, accurate to 0.01 A
	* TEC Vol: x.x V	The first stage voltage of pump2 cooler, 0.1 V
	+5V Read: x.x V	+5V power supply voltage , accurate to 0.1 V
	-5V Read: -x.x V	-5V power supply voltage , accurate to 0.1 V
	Box Temper: xx.x °C	Box temperature, accurate to 0.1 °C
	S/N: xxxxxxxx	Device serial number
	IP Address: xxx.xxx.xxx.xxx	IP address
	Subnet Mask:xxx.xxx.xxx.xxx	Subnet mask
	Net Gateway:xxx.xxx.xxx.xxx	Gateway
	Mac: xxxxxxxxxxxx	Physical address
	Trap1: xxx.xxx.xxx.xxx	trap1 address
	Trap2: xxx.xxx.xxx.xxx	trap2 address
	Software Version: Vx.xx.x.x	Firmware version number

The ultra high power output EDFA no the “*” menu.

6.3 Setup Menu



2.Set Parameters	Set Low Input Threshold	Set the low optical input power alarm threshold, range -3.0~10.0dBm
	Set High Input Threshold	Set the high optical input power alarm threshold , range -3.0~10.0dBm
	*Set Output ATT	Set the optical output power attenuation
	Set Local IP Addr	Set IP address
	Set Subnet Mask	Set subnet mask
	Set Gateway	Set gateway
	Set Trap1 Address	Set trap1
	Set Trap2 Address	Set trap2
	Set Buzzer cfg	Set the switch of beeper
	Restore Factory config	Restore the factory configuration , set content as shown above

The ultra high power output EDFA no the “*” menu.

6.4 Warning menu

3.Alarm Status	Input Status: xxx	xxx= <i>LOLOW</i> :	Very low optical input power alarm
		xxx= <i>LOW</i> :	Low optical input power alarm
		xxx= <i>HIGH</i> :	High optical input power alarm
		xxx= <i>HIHIGH</i> :	Very high optical input power alarm
	Output Status: xxx	xxx= <i>LOLOW</i> :	Very low optical output power alarm
		xxx= <i>LOW</i> :	Low optical output power alarm
		xxx= <i>HIGH</i> :	High optical output power alarm
		xxx= <i>HIHIGH</i> :	Very high optical output power alarm
	Pumpx Power: xxx	xxx= <i>LOLOW</i> :	Very low power of pump x alarm
		xxx= <i>LOW</i> :	Low power of pump x alarm
		xxx= <i>HIGH</i> :	High power of pump x alarm
		xxx= <i>HIHIGH</i> :	Very high power of pump x alarm
	Pumpx Bias: xxx	xxx= <i>LOLOW</i> :	Very low bias current of pump x alarm
		xxx= <i>LOW</i> :	Low bias current of pump x alarm
		xxx= <i>HIGH</i> :	High bias current of pump x alarm
		xxx= <i>HIHIGH</i> :	Very high bias current of pump x alarm
	Pumpx Temper: xxx	xxx= <i>LOLOW</i> :	Very low temperature of pump x alarm
		xxx= <i>LOW</i> :	Low temperature of pump x alarm
		xxx= <i>HIGH</i> :	High temperature of pump x alarm
		xxx= <i>HIHIGH</i> :	Very high temperature of pump x alarm
Pumpx Tec: xxx	xxx= <i>LOLOW</i> :	Very low cooling current of pump x alarm	
	xxx= <i>LOW</i> :	Low cooling current of pump x alarm	

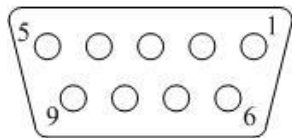
		<i>xxx= HIGH:</i>	High cooling current of pump x alarm
		<i>xxx= HIHIGH:</i>	Very high cooling current of pump x alarm
	+5V Status: xxx	<i>xxx= LOLOW:</i>	Very low +5V DC power supply alarm
		<i>xxx= LOW:</i>	Low +5V DC power supply alarm
		<i>xxx= HIGH:</i>	High +5V DC power supply alarm
		<i>xxx= HIHIGH:</i>	Very high +5V DC power supply alarm
	-5V Status: xxx	<i>xxx= LOLOW:</i>	Very low -5V DC power supply alarm
		<i>xxx= LOW:</i>	Low -5V DC power supply alarm
		<i>xxx= HIGH:</i>	High -5V DC power supply alarm
		<i>xxx= HIHIGH:</i>	Very high -5V DC power supply alarm
	Device Temper: xxx	<i>xxx= LOLOW:</i>	Very low chassis temperature alarm
		<i>xxx= LOW:</i>	Low chassis temperature alarm
		<i>xxx= HIGH:</i>	High chassis temperature alarm
		<i>xxx= HIHIGH:</i>	Very high chassis temperature alarm

7. Communication Setup Descriptions

7.1 Communication Interface Description

1) RS232 communication interface

Adopt DB9 standard connector, the pin definitions as follow:



1: No Connect

2: TX

3: RX

4: No Connect

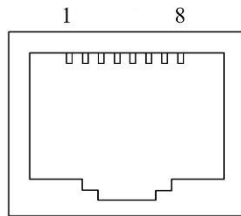
5: GND

6: No Connect

The serial communication uses the standard NRZ form, 1 starts bit, 8 data bits, 1 stop bit and the baud rate is 38400.

2) LAN communication interface

Adopt RJ45 standard connector, the pin definitions as follow:



LAN

- | | | |
|---------------|---------------|--------|
| 1: TX+ | 2: TX- | 3: RX+ |
| 4: No Connect | 5: No Connect | 6: RX- |

7.2 The management and application of network interface

一、 The transportation feature of category II:

- 1 Data communication of category II transponder telemetry depends on IP network, it is widely used in LAN, MAN, INTNET, support WLAN、 VPN and route。
- 2 Category II transponder telemetry will be needed set the only IP, mask and GW by manual when operating, we do not suggest adopting DHCP

二、 Calibrate:

Debugging should be done in the equipment science.

1 Conditions for debugging:

- 1.1 Optical equipment and transponder telemetry are powered.
- 1.2 Fluently IP network for category II transponder telemetry.
- 1.3 IP resources for category II transponder telemetry have been divided and set up completely.

2 The tools and files for calibrate:

Notebook PC, administrator software (stand-alone version), IP Detect, records for operating and calibrate.

3 Calibrate:

3.1 Set up PC IP same with transponder telemetry. The IP for transponder telemetry is 192.168.0.101, the PC can be set 192.168.0.2.

3.2 Take off the internet cable of transponder telemetry, connect PC and transponder telemetry with own internet cable, for the internet cable, we can use straight line or cross line. Note: For special PC, it can be only use cross line.

4 Fault judgment:

Phenomenon	Reasons
Parameters error	1、 Data wire can't be connected 2、 Fault for transponder telemetry
Transponder telemetry OFF-LINE	1) Fault for IP network 2) Fault for IP, mask and GW. 3) transponder telemetry crashed 4) ARP cache is not cleaned out completely.
Transponder telemetry can not be searched IP Detect	The IP of PC and transponder telemetry are not in the same net work section.
Transponder telemetry I Pcan not be revised by IpDetect	The IP of PC and transponder telemetry are not in the same net work section or the mask error
Working parameters can not be foundby adopting generally administrator	Group (read) 、 Group (write) PUBLIC Uppercase and lowercase inconsistency

8. Installation debugging

8.1 Unpack and Check

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

8.2 Instruments and tools

1. An optical power meter;
2. A digital multimeter;
3. A standard optical fiber test jumper (SC/APC);
4. Some absolute alcohol and medical cotton wool;

8.3 Installation steps

1. Before installing the equipment, please read the <User's manual> carefully and install the equipment according to the <User's manual>. **Note:** For the man-made damage and other all consequence caused by error installation that not according to the <User's manual>, we will not be responsible and will not supply free warranty.
2. Take out the device from the box; fix it to the rack and reliably grounding. (The grounding resistance must be $< 4\Omega$).
3. Use the digital multimeter to check the supply voltage, make sure the supply voltage comply with the requirements and the switch key is on the "OFF" position. Then connect the power supply.
4. Input the optical signal according to the display message. Turn the switch key to the "ON" position and observe the front panel LED status. After the pump working status indicator turn into green, the device is working normal. Then press the menu button on the front panel to check the working parameters.
5. Connect the optical power meter to the optical signal output end by the standard optical fiber test jumper, then measure the optical output power. Affirm the measured optical output power and the displayed power are the same and have reached the nominal value. (Affirm the optical power meter is on 1550nm wavelength test position; the optical fiber test jumper is the matched one and on the connector surface has no pollution.) Remove the standard optical fiber test jumper and optical power meter; connect the device to the network. So far, the device has been completely installed and debugged.

9. Clean and maintenance method of the optical fiber active connector

In many times, we consider the decline of the optical power as the equipment faults, but

actually it may be caused by that the optical fiber connector was polluted by dust or dirt. Inspect the fiber connector, component, or bulkhead with a fiberscope. If the connector is dirty, clean it with a cleaning technique following these steps:

1. Turn off the device power supply and carefully pull off the optical fiber connector from the adapter.
2. Wash carefully with good quality lens wiping paper and medical absorbent alcohol cotton. If use the medical absorbent alcohol cotton, still need to wait 1~2 minutes after wash, let the connector surface dry in the air.
3. Cleaned optical connector should be connected to optical power meter to measure optical output power to affirm whether it has been cleaned up.
4. When connect the cleaned optical connector back to adapter, should notice to make force appropriate to avoid china tube in the adapter crack.
5. If the optical output power is not normal after cleaning, should pull off the adapter and clean the other connector. If the optical power still low after cleaning, the adapter may be polluted, clean it. (Note: Be carefully when pull off the adapter to avoid hurting inside fiber.)
6. 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 active optical fiber connector, you should avoid direct shining at eye, which will cause permanence burn!!!!**
- b. **Use proper energy to install the active optical connector, or the ceramic tape in the adaptor will lead to break. Once the ceramic tape is broken, the optical output power will decrease rapidly. And turn the active optical fiber connector slightly, the optical output power changes obviously.**
- c. **Please operate the optical fiber under the condition of shut off the pump laser. Or the high output power will lead to burn the joint of the optical output fiber, which will cause the output power decrease.**

10. After-sales Service Description

1. If the equipment fault is resulted from the users' improperly operation or unavoidable environment reasons, we will responsible maintenance but ask suitable material cost.
2. When the equipment breaks down, immediately contact local distributor.
3. The site maintenance of the fault equipment must be operated by professional technicians to avoid worse damage.

Special notice: If the equipment has been maintained by users, we will not responsible free maintenance. We will ask suitable maintenance cost and material cost.

11. Disclaimer

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