Operation Manual

High Power Fiber Amplifier Series

Keep this manual properly.
Read and follow the safety procedures before operation.

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Safety Warnings and Precautions

- Equipment operators must strictly abide by relevant safety regulations and preventive measures.
- Operators should regularly inspect the equipment and ensure that all relevant personnel comply with safety regulations.
- Since lasers can cause damage to eyes and skin, please avoid direct or scattered laser radiation from entering the eyes or shining on the skin.
- Note that lasers can cause damage to the retina and conjunctiva.
- Do not touch the fiber end face directly with your hands to prevent dust from entering and affecting product characteristics.
- Keep the equipment away from high temperature, high pressure, and humid environments.

To prevent equipment damage due to static electricity, take appropriate defensive measures when touching the equipment!

Lasers can damage certain electronic devices,

Lasers can accelerate the deterioration of certain materials,

Laser radiation can harm the human body and certain sensitive materials!

Version: V1.3 Date: 2024-10-22

Product Overview

Ytterbium doped fiber amplifier (YDFA) through the semiconductor laser pumping ytterbium doped fiber to generate gain, used to amplify the 1030 ~ 1080nm band laser signals, Hi1060 single-mode fiber or PM980 bias-protecting fiber or other user-specified fiber output, the output power is continuously adjustable, with the advantages of high gain and low noise. The desktop YDFA is easy to operate for experimental purposes and allows the user to adjust the pumping current and output power via the front panel buttons. A more compact modular YDFA is also available for easy system integration. Both desktop YDFA and modular YDFA can support software control and serial command control. Users should select the appropriate YDFA model according to their own needs, in order to achieve the best optical signal amplification effect, we can also provide customized YDFA products for specific customer needs, specific product parameters can be found in the product manual.

Features

- Optional desktop or modular design
- Wide operating wavelength range
- High Output Power

Applications

- Nonlinear Optics
- Fiber sensing
- Fiber lasers

Standard Accessories

1. 1 power cord (adapter or switching power supply)
2. 1 data cable (USB - RS232/DB9)
3. 3 Fiber optic jumpers
4. 1 copy of the product operation manual
5. 1 copy of the product test sheet
6. Shipping list

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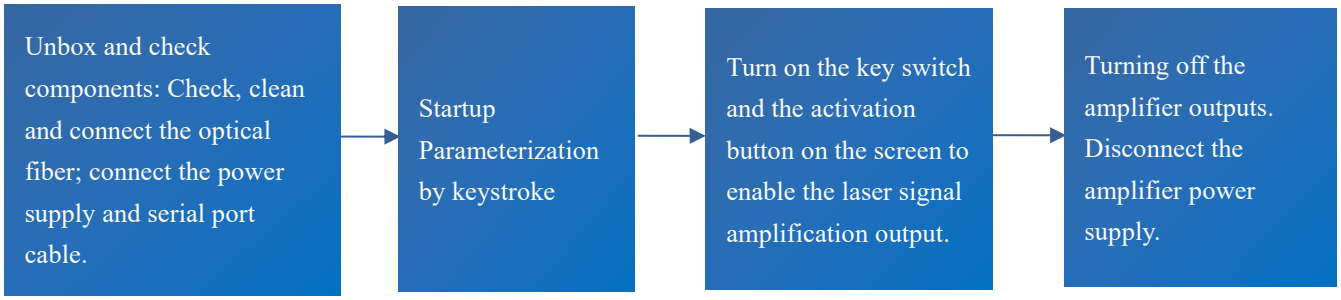
Basic Operation Step



Step 1. Unboxing and Assembly

Before assembly, check if all components are complete, including the power cord or power adapter, optical fiber patch cord, operation manual, test report, etc.

Connect the power supply. Desktop amplifiers can be directly connected to AC power; modular amplifiers should be connected to a DC switching power supply or regulated power supply that meets their power-supply requirements. Connect the signal light source and the amplifier input end with an optical fiber patch cord. The amplified laser signal is output through the optical fiber patch cord. The amplifier output end is usually equipped with a fixed non-detachable optical fiber patch cord. When using an optical fiber adapter to connect optical fiber patch cords, ensure that the types of optical fiber patch cord connectors are consistent. (The input power of the signal light source should refer to the product test sheet. Otherwise, the optical fiber amplifier will be locked and unable to work).

Step 2. Turn on the power switch on the back of the amplifier to start it.

Make sure that the emergency stop switch (STOP) is in the pop-up and open state, if it is in the closed state, you need to turn clockwise to open the emergency stop switch (STOP). Note: At this time, the working mode (APC/ACC/AGC) and the working current of the amplifier are the parameter settings from the last use. If adjustment is required, it can be modified through the screen or the upper - computer software. Usually, the amplifier is set to the lowest working current and the lowest output power

at the factory.

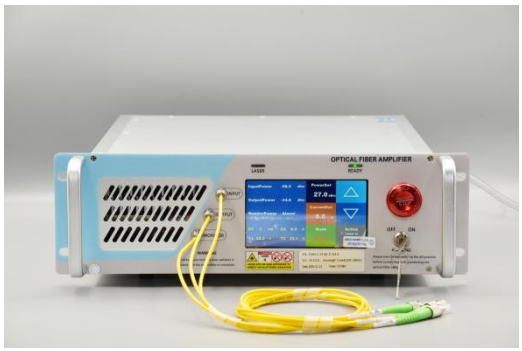
Step 3. Turn on the key switch (On), press the activation button (ON/OFF) on the screen, and set appropriate output power and pump current. Then the laser will be amplified and output.

During the experiment, adjust the working mode and output power in a timely manner as needed. It should be noted that when the amplifier is in the light - emitting state (with the activation switch on), it is strictly prohibited to perform insertion and extraction operations on the fiber optic patch cord connectors. Otherwise, it is very likely to cause damage to the end - face of the fiber optic patch cord connectors and the amplifier itself, resulting in malfunctions.

Step 4: After use, turn off the activation key switch (Enable) to cut off the amplifier output, and finally turn off the power switch.

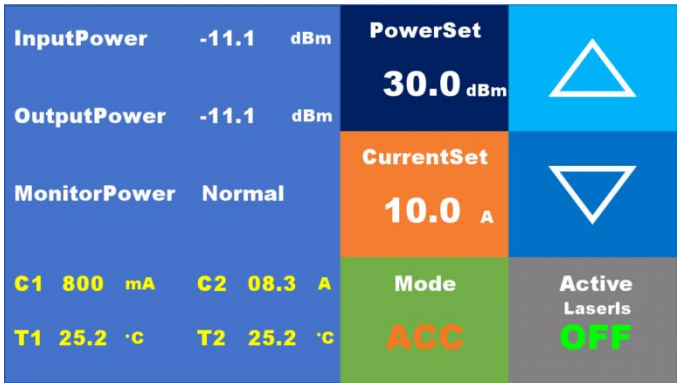
Front and Rear Panels and Interfaces

1. The front panel is as shown in the following figure. Sequentially, there are input/output/Monitor optical fiber interfaces, a touch-controllable liquid-crystal screen, an enable key switch (Enable), and an output indicator light. This product model uses a liquid-crystal touch screen to control and display working parameters.



2. The rear panel is as shown in the following figure. Sequentially, there are an external power interface and switch, an RS232 DB9 communication port, and a cooling fan. The power supply is adapted to AC100 - 240V wide - range AC voltage and can be used directly in any country or region.

3. The upper-left corner area of the screen is the status display area: It shows the real-time input optical power (Input Power), output optical power (Output Power), pump laser current **Pump Current (C1/C2)**, and pump laser temperature **LD Temp (T1/T2)**; other areas are for control and parameter input.



Working Modes and Control Methods

1. Amplifier working mode control: YDFA natively support the following two working modes. The control logic for each mode can be referred to in the subsequent descriptions.

   - ✧ Automatic Pump Current Control Mode (ACC mode)
   - ✧ Automatic Power Control Mode (APC mode)

   In the lower - right corner of the touchscreen **Mode** area is the mode selection button. Pressing it can cycle through the **APC/ACC** modes.

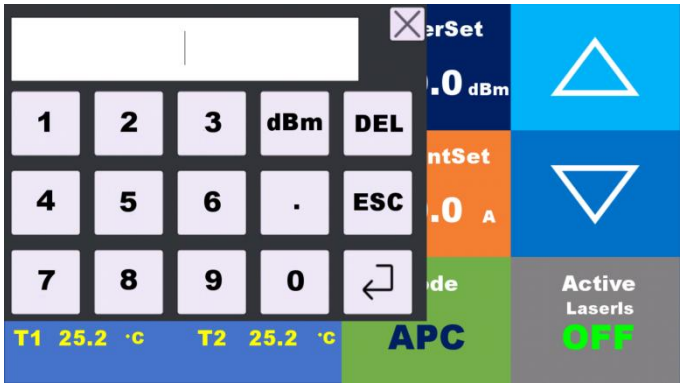
   Note: You must turn off the key switch before switching modes, it is impossible to switch modes when the key is turned on, the reason is that the output power of the most recent setting in ACC or APC mode may be very different and is memorized by the YDFA, if the key is turned on to allow the mode to be cut, it is very likely to result in the sudden output of a high power laser and thus damage to the devices or equipments connected to the fiber optic of the YDFA output, so the sequence of operation for switching modes should be as follows: Turn off the key or the enable key → Switch modes → Adjust the output power and then → Turn on the key or enable key to activate the output.

2. Amplifier Parameter Settings：

   ACC Mode: You can directly click the △ and ▽ areas to increase or decrease the current value. Long-press for coarse adjustment and short-press for

fine adjustment. Alternatively, click the **Current Set** area, then input the required pump current value (unit: Ampere, A) on the pop - up keyboard. After setting, press Enter ↵ to take effect, as shown in the following figure:

APC Mode: You can directly click the △ and ▽ areas to increase or decrease the power value. Long-press for coarse adjustment and short-press for fine adjustment. You can also click the **Power Set** area and input the required power value on the pop-up keyboard. After setting, press Enter ↵ to take effect, as shown in the following figure:



3. Parameter setting ranges under two control modes：

APC：10%~100% of the maximum power value

ACC：0~maximum current value

(*Maximum power and maximum current values are shown in the test report of each YDFA, under both APC and ACC modes, the pump laser current will not exceed the factory-set value, so please rest assured to use)

4. Output activation of the amplifier:

The output activation of the amplifier is triple controlled by the **Active** button on the screen as well as the key switch (ON/OFF) and the red emergency stop switch (STOP). The **Active** area in the lower right corner is used to control and display the current amplifier output activation status; unscrew the red emergency stop switch (STOP) clockwise, and then turn the key to the ON state, and then switch the **Active** area on the screen OFF to the ON state, and every time you click on the screen area, the amplifier output state is switched between having an output and not having an output (only the key switch is turned on, and can be switch to ON state), and finally observe the status of LASER lamp, LASER lamp blinking means no amplified light output, LASER lamp is always on means that the amplified laser is being output.

5. **Note:** If you need to stop the amplifier in an emergency during use, you can immediately shoot the red emergency stop button (STOP), and after the problem has been troubleshooted, you can rotate the emergency stop switch clockwise to reset and then reopen the amplifier;
6. This fiber amplifier also supports control via upper - computer software. The default communication port is RS232 DB9, located on the rear panel of the amplifier. Special upper - computer software and serial port communication protocol code will be provided with the goods.

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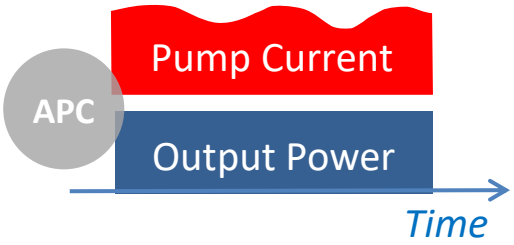
Explanation of Fiber Amplifier Operating Modes

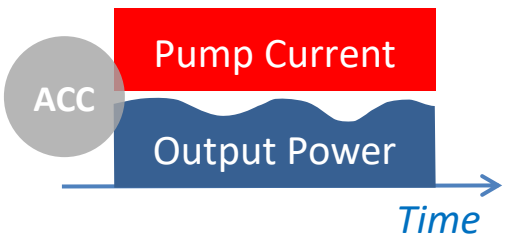
YDFA typically have the following control modes: **APC/ACC**

1. **APC Mode (Automatic Power Control Mode)**: In this mode, the user sets the output power of the amplified signal light. The amplifier automatically adjusts the pump current based on the output power monitored by the PD (Photodetector) to stabilize the output signal. In APC mode, the adjustable range of the output power for the user is usually 10% - 100% of the maximum output power. The advantage of APC mode is that when the input optical power fluctuates, the amplifier will minimize the fluctuation of the output power.
2. **ACC Mode(Automatic Current Control mode):** The user sets the pump operating current of the amplifier, and the amplifier automatically locks it to achieve a constant pump current. When the input optical power fluctuates, the output power will also fluctuate accordingly.

The parameters monitored/controlled under the two modes are different, resulting in different effects, as shown in the following table and schematic diagram.

Working Mode	Parameter/Range Set by User	Parameter Monitored by Amplifier	Parameter Controlled by Amplifier	Purpose and Effect Achieved
APC Mode (Auto Power Control)	Output Power/10-100%	Output Power	Pump Current	Stable Output Power
ACC Mode (Auto Current Control)	Pump Current/0~100%	Pump Current	Pump Current	Stable Pump Current





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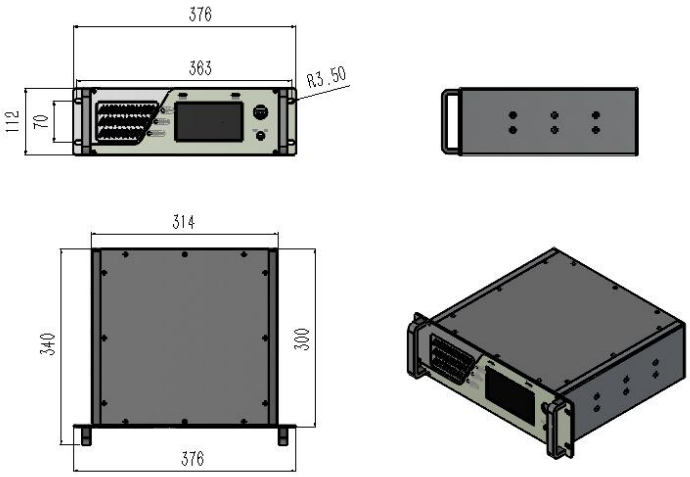
Operation Precautions and Maintenance

1. The optical fiber amplifier should operate within the rated optical signal wavelength and power range. Do not input optical signals beyond the wavelength and power ranges, as this may damage the optical fiber amplifier. For specific parameters, please refer to the product test sheet.
2. When starting up, make sure the power switch and key switch are off before connecting to the power supply; when shutting down, turn off the key switch first and disconnect the power supply after the output indicator light is off; do not cut off the power supply directly when the amplifier is working.
3. Contaminated fiber optic connector end faces are highly susceptible to burnout when the laser is turned on, even at low laser power. Before connecting the optical fiber connector, use a dedicated optical fiber cleaning tool to thoroughly clean the end-face of the optical fiber connector. Observe carefully with the aid of an optical fiber end-face detector. Confirm that there is no dust or contamination, and then connect through an optical fiber flange. When cleaning, inspecting, and connecting the optical fiber connector end-face, ensure that the laser and the amplifier are in the output - stop state. Do not operate with light. After use and disconnection from other optical fiber connectors, be sure to cover the optical fiber connector with a dust-cap.
4. Frequent insertion and extraction of optical fiber connectors at the input and output ends are not recommended, as it may cause dust contamination, resulting in increased loss or damage to the end-face of the optical fiber connector.
5. The FC/APC connector at the main output is for power testing only, and it is strictly prohibited to dock with other fiber optic connectors;
6. If the output fiber needs to be connected to other fibers, it is recommended to use a fusion splicer to fuse;
7. If the output end is connected to a spatial optical system, it is recommended to

use a spatial light collimator with an FC/APC interface.

8. Pay attention to moisture - proof, dust - proof, and anti - corrosion measures. Store it in a dry place.

Dimensions



Quality Assurance and After - sales Service

1. Product Quality Assurance Period

From the date of delivery, if there are quality problems (non-human-induced) with the product within one year, the customer can request the manufacturer to replace parts or the entire unit free of charge. After one year, the manufacturer will provide paid repair services.

2. Product Warranty Scope

During the free warranty period, free repair or replacement services will be provided for malfunctions caused by product quality issues.

During the warranty period, our company reserves the right not to provide free repair services in the following situations:

1) The product is damaged or impaired due to natural factors or environmental influences (such as electric shock, dust).
2) The product is damaged due to non - standard operation by the user.
3) The product has obvious signs of human - induced damage.
4) The product has been disassembled, modified, or repaired without the authorization of our company.
5) The quality - assurance label on the light source housing has been tampered with or is incomplete.

The product is damaged or lost during transportation.

Product Warranty Card

Product Name	
Product Number(PN)	
Product Serial Number(SN)	
Purchase Date	
Description of Product Defects	
User Name	
Contact Address	
Contact Phone	
E-mail	

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