# 1U OLP Equipment User Manual

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# Catalogue

# 1 Overview of the OLP

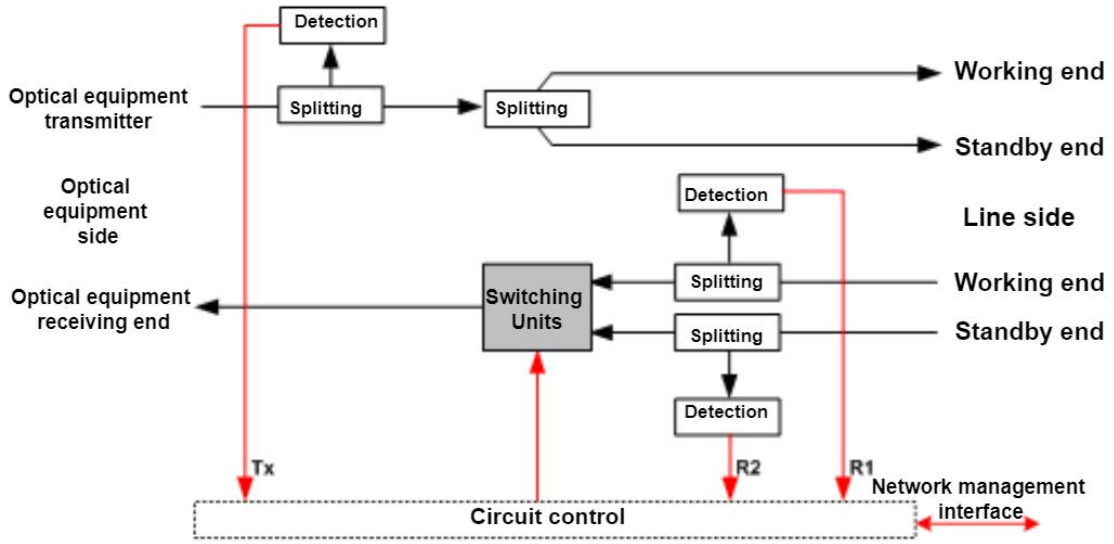
The optical fiber protection system consists of optical fiber protection equipment and operation and maintenance terminals, capable of achieving functions such as optical power monitoring, automatic optical path switching, and network management. In an optical communication network, the equipment continuously monitors the optical power on both the active and backup fibers. When it detects that the optical power value on the current active fiber falls below the set switching threshold, it sends SMS alerts, displays warnings, and automatically switches to the backup fiber, thereby protecting the optical transmission system lines. The equipment can be used to construct various protection schemes for paths and trunk lines in a simple and cost-effective manner, and can also protect networks that require optical path switching, thus forming an optical communication network with no interruption, high reliability, safety, flexibility, and strong disaster resistance.

# 2 System characteristics

| |
|---|
| Shorten the interruption time of communication, improve maintenance efficiency, and automatically restore communication in a very short time |
| Reduce the loss caused by line failure |
| Increase the reliability of transmission network and improve the service quality of operators |
| Scheduling the primary and backup working routes (line maintenance, circuit switching) at any time without interrupting the service |
| It supports screen display, real-time monitoring of main and spare optical fiber power, and transparent transmission |
| Support the long and short range control of the whole system, convenient for the management and maintenance of equipment |

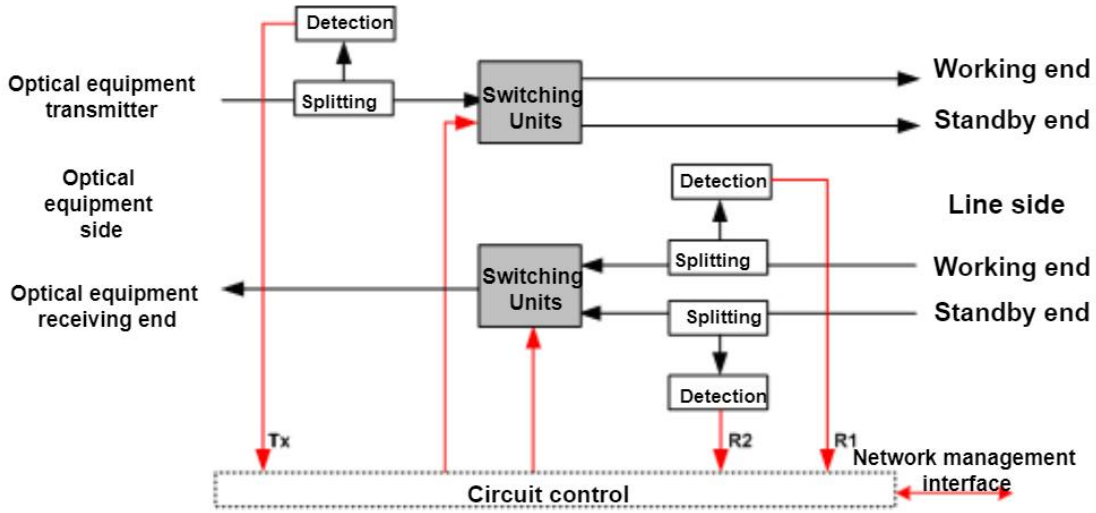
# 3 Working principle

The composition of the 1+1 protection system is shown in the following figure:




OLP1+1 protection mode

The composition of the 1:1 protection system is shown in the following figure:




OLP1: 1 protection mode

# 4 Optical line protection equipment

## 4.1 Equipment parameters

| | |
|---|---|
| **machine frame** | One-unit chassis |
| **working temperature** | -5℃ ~ +55℃ |
| **relative humidity** | No condensation from 5% to 95% |
| **storage temperature** | -20℃ ~ 75℃ |
| **device power supply** | AC 220V/50~60Hz, DC (-36~-72)V dual power supply |
| **Equipment size** | Standard 19' rack 1U (483*249*44mm) |
| **maximum power dissipation** | 40W |
| **heat radiation** | Fan cooling |
| **MTBF** | More than 100,000 hours |

## 4.2 Factory setting

- Cutting mode setting: no automatic cutting;
- Device button usage permission: allowed;
- The serial port is set to: 115200 baud, 8 data bits, 1 stop bit, no parity check;

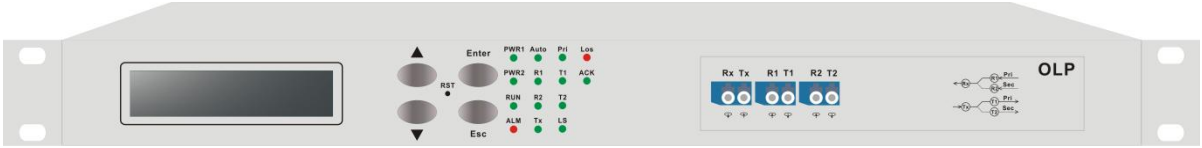
Note: except for users with special requirements.

# 5 Instructions for use

## 5.1 Description of chassis structure

Using a 19-inch 1U integrated design, the single chassis provides 2 power slots; it adopts a front panel fiber exit method, with all optical interfaces designed on the front; network management ports and serial ports are both located on the back; the air duct design uses a right-side intake and left-side exhaust method, with an intake port on the right side of the chassis. Cold air is drawn into the chassis through a cooling fan unit and then expelled from the left side outlet.

## 5.2 Panel description



**explain:**

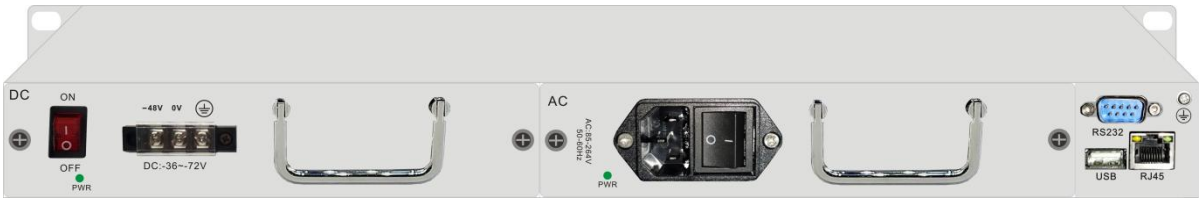
1） Optical interface description: The flange on the device panel is the signal interface.

2） When removing the optical fiber connection cable, cover the dust cap to prevent hard objects, dust or other dirt from touching, damaging and contaminating the optical output port.

3） LCD display: display of input and output optical power and other related information.

4） ▲—— Up key; ▼—— Down key; Enter—— OK key; Esc—— Cancel key.

5） RST: Supports operation of the button to reset and initialize the hardware.




**explain:**

1） The power supply (PIU) slot is on the back of the device, supporting AC (APU)/DC (DPU) options, and power 1+1 hot backup.

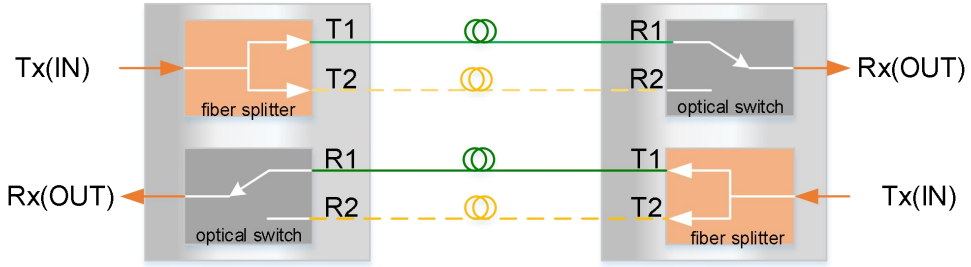
2） Indicator light: PWR: On: normal power supply; off: no power supply or abnormal.

3） RJ45 Ethernet interface, RS-232 serial port: communication interface for equipment monitoring data information.

## 5.3 OLP: 1+1 optical protection equipment

The primary function of the OLP optical protection device is to assist the wavelength division system in completing 1+1 optical path protection and 1+1 optical wavelength protection solutions. It can monitor the signal status of the main and backup routes in real time. In case of an interruption or degradation of the optical signal, it can automatically perform a secure switchover between the main and backup routes, ensuring the rapid recovery of the system's optical signal. OLP technology completes route switching operations at the optical layer, offering unparalleled advantages over upper-layer service protection. It is the best solution for providing users with uninterrupted communication.

**Engineering link diagram**




**size of product**

| function | | explain |
|---|---|---|
| **Working wavelength range** | | 1260nm~1650nm |
| **OLP type** | | OLP-1+1 (dual-send and receive) |
| **Swap the time** | | < 15ms |
| **Loss of transmission** | **Work path** | < 4dB |
| | **Alternate path** | < 1.2dB |
| **Monitor the range of optical power** | | -50 dBm ~+25dBm |
| **optical interface** | | LC/UPC (optional) |
| **maximum power dissipation** | | 5W |
| **MTBF** | | More than 100,000 hours |

**Definition of OLP1+1 device interface**

| Interface screen printing | name | Function/Link |
|---|---|---|
| **Rx** | OLP local output interface | Connect the local device to the receiving port |
| **Tx** | OLP local receiving interface | Connect the local device to the transmitter port |
| **R1** | Main route receives interface | Connect to the other T1 |
| **T1** | Main route output interface | Connect to the other end R1 |
| **R2** | Prepare routing receiving interface | Connect to the other end T2 |
| **T2** | Prepare routing output interface | Connect to the other end R2 |

**OLP1+1 equipment indicator light description**

| Indicators are printed with wire | name | description |
|---|---|---|
| **PWR1/PWR2** | OLP power light | Light, OLP power supply is normal, off, power supply fault |
| **RUN** | OLP operation indicator light | Light, OLP is running normally, off, operation fault |
| **ACK** | The OLP command returns the indicator light | On, there is a return command; off, there is no return command |
| **LOS** | OLP equipment signal | On, light signal lost; off, signal lost |
| **ALM** | OLP alarm indicator light | No light or abnormal input/output light alarm |
| **Auto** | OLP working mode indicator light | On: work in automatic mode; off: work in manual mode |
| **R1** | The OLP main route receives the indicator light | Light, normal reception, off, abnormal reception |
| **R2** | OLP has a standby route receiving indicator light | Light, normal reception, off, abnormal reception |
| **T1** | OLP main routing output interface | Bright, output is normal, off, output is abnormal |
| **T2** | OLP prepares the routing output interface | Bright, output is normal, extinguishing output is not normal |
| **Pri** | Main route working indicator light | Light, working on the main route |

**OLP1+1 equipment Settings**

**1. Work mode setting**

The equipment provides two working modes: manual mode and automatic mode. Manual mode is used for equipment commissioning and forced switching.

(1) Select automatic or manual mode through the network management;

(2) Select the device button, and hold down the device panel button until the Auto light is off (manual operation) or on (automatic operation);

After the operator completes the operation, the equipment should be in automatic working mode, otherwise it may lead to the failure of protection.

Note: The device supports manual mode and automatic return mode. The return time is set to 5 minutes by factory setting.

**2. Main route Settings**

Equipment provides the main routing Settings. Customers can choose R1 or R2 as the

main routing according to their needs; R1 is the default main routing at factory;

**3. Work route setting**

The default R1 is the primary working route (Pri), and R2 is the backup working route (Sec).

When the device is in automatic working mode, the device will automatically select the working route according to the line situation:

(1) When only one route is available: work on the channel corresponding to the available route;

(1) Both routes are available: The route corresponding to the route that is first available in time (if the device works on the backup channel, the device will automatically switch back to the main channel after 5 minutes, provided that the device has started the rollback function).

When the route is manually selected, set the device to manual mode and set the working route through the panel button or network management;

**4. Switch the threshold power value setting**

The initial switching threshold power value of the device is-30dBm. Users can set it according to the device type and the actual situation of the other line:

Basic principle: The switching threshold power value is slightly greater than the minimum receiving power value of the optical transmission equipment, and the difference is 0.5~1dB (the minimum receiving power value is to ensure the normal transmission of the whole system service).

**5. Return cut mode setting**

Definition of switchover: In automatic mode, the device switches from the backup path to the primary path. It can be set to "Automatic Switchover" or "Automatic Non-Switchover." In the "Automatic Non-Switchover" mode, even if the switchover conditions (both primary and backup routes are normal) are met, it will not automatically switch from the backup path to the primary path.

**6. Return delay setting**

When the device is in "automatic rollback" mode, the optical path is in the standby state, and the device works in automatic mode, the device will perform optical detection on the

main and standby paths in real time. If the optical power of the main and standby paths is normal for M times (0~999 minutes), the device will automatically rollback to the main path (Pri) state.

## 5.4 OLP: 1:1 optical protection equipment

The OLP optical protection board primarily assists the wavelength division system in achieving 1+1 optical line protection and 1+1 optical wavelength protection solutions. It can monitor the signal status of primary and backup routes in real time. In case of an interruption or degradation of optical signals, it automatically performs a secure switchover between the primary and backup routes, ensuring the rapid recovery of system optical signals. OLP technology completes route switching operations at the optical layer, offering unparalleled advantages over upper-layer service protection. It is the optimal solution for providing users with uninterrupted communication.

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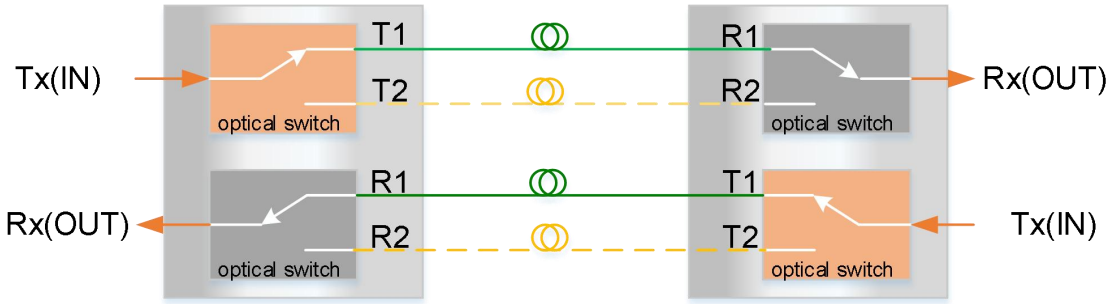


**size of product**

| function | | explain |
|---|---|---|
| **Operating wavelength range** | | 1260nm~1650nm |
| **OLP type** | | OLP-1: 1 (optional) |
| **Swap the time** | | < 35ms |
| **Loss of insertion** | **Work path** | < 1.3dB |
| | **Alternate path** | < 1.3dB |
| **Monitor the range of optical power** | | -50 dBm ~+25dBm |
| **optical interface** | | LC/UPC |
| **MTBF** | | More than 100,000 hours |

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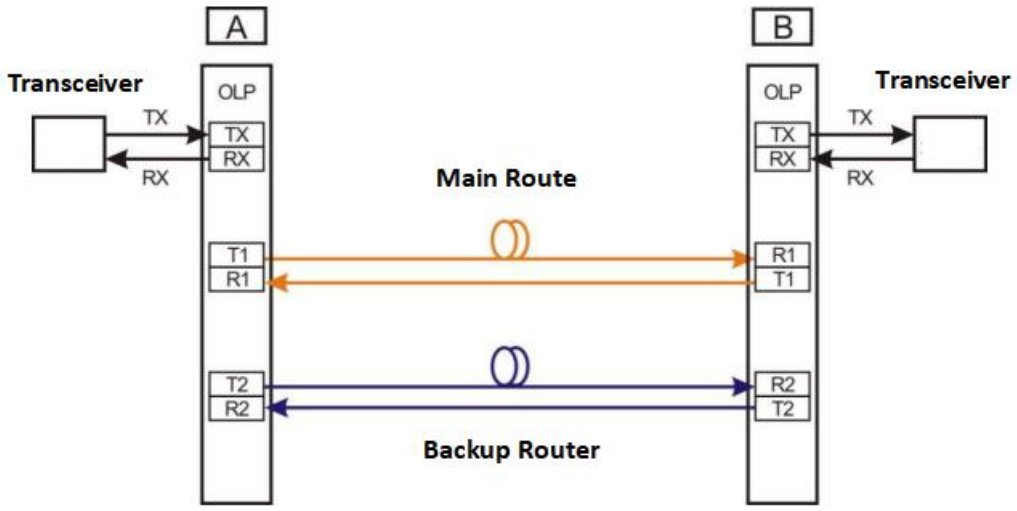
When the device is in "automatic rollback" mode, the optical path is in the standby state, and the device works in automatic mode, the device will perform optical detection on the main and standby paths in real time. If the optical power of the main and standby paths is normal for M times (0~999 minutes), the device will automatically rollback to the main path (Pri) state.

**Group application**

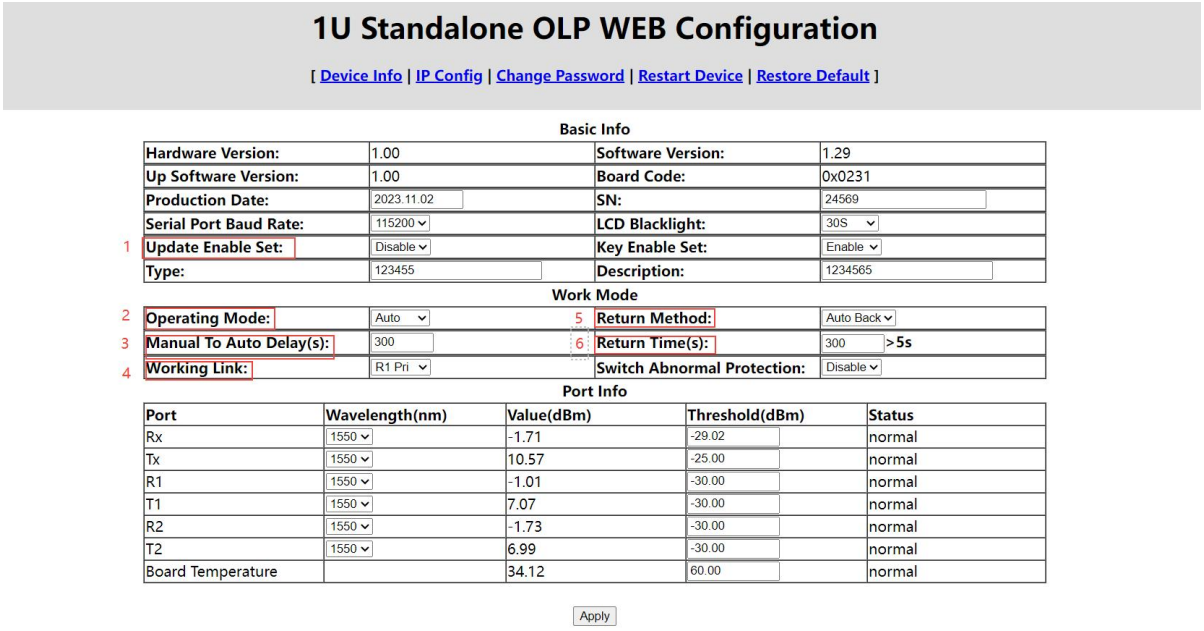



Note: OLP TX Connect the TX light port of the customer equipment, RX connect the RX light port of the customer equipment, R1 connects to the OLP equipment T1 of the opposite end through the optical cable, R2 connects to the OLP equipment T2 of the opposite end, T1 connects to the OLP equipment R1 of the opposite end, and T2 connects to the OLP

equipment R2 of the opposite end;

## 5.5 Information on the use of equipment network management

Enter the IP address of the browser input device to enter the Web interface. Account: admin Password: 888888. Most of the functions of the Web terminal setting and button panel setting are the same, whether it is set on the panel or on the web terminal, both ends will be synchronized.




1、 Upgrade enabled (Update Enable Set)

Under normal circumstances, it is Disable. When upgrading the device by connecting to the network port, it needs to be set to Enable.

2、 Work mode (Operating Mode)

The working mode is divided into manual mode (Manual) and automatic mode (Auto). When the working mode is automatic mode, if the main line fails, it will automatically switch to the standby line. When the working mode is manual mode, if the main line fails, it will not automatically switch to the standby line. Same panel menu option 1.

3、 Manual return to automatic mode delay (Manual To Auto Delay)

When the system is in manual mode, it will automatically switch to automatic mode after a delay. The delay can be set. Same panel menu option 6.

4、 Workline (Working Link)

Select the working line, R1 (Pri) is the main line, R2 (Sec) is the backup line, and the default working mode is on the main line. Same panel menu option 2.

5、 Cutting method (Return Method)

Set the rollback mode, which is divided into Keep and Auto Bcak. In automatic rollback mode, when working on the backup path, both the main path and the backup path are normal. After the rollback delay, it will actively cut back from the backup path to the main path. The

same panel menu option 5.

6、 Backcut delay (Return Time)

Set the rollback delay in automatic rollback mode. When the delay is over, the backup path will be switched back to the main path. Same panel menu option 7.

# 6 Precautions and maintenance

## 6.1 Precautions

(1) When using this equipment, you must correctly connect each port according to the optical path connection instructions.

(2) The equipment shell should be grounded, and the input power voltage should be within the range required by the equipment.

(3) If the host is disturbed by a mutation and abnormal, shut down the host before processing.

(4) The optical input port must be well connected and accurately positioned, otherwise the measurement results and insertion loss may not be correct.

(5) When switching the optical path channel, slight vibration or sound is normal.

## 6.2 Equipment maintenance

The reasonable use and proper storage of the equipment can maintain good performance indicators for a long time and prolong its service life, so appropriate maintenance is required:

(1) The equipment should avoid strong mechanical vibration, collision, fall and other mechanical damage. During transportation, there must be good packaging and vibration reduction, rainproof and waterproof measures;

(2) The equipment should be kept clean regularly, and there should be no corrosive gases such as acid and alkali in the working environment. The chassis and panels can be gently cleaned with a clean towel soaked in water or soapy water. Alcohol and other solvents are prohibited.

(3) When removing the optical fiber connection line, cover it with a dust cap in time to prevent hard objects, dust or other dirt from touching the end face of the optical fiber.

If you have any questions, please contact us. We would be very happy to hear from you.

# 7 Common troubleshooting

| Fault performance | Possible cause | terms of settlement |
|---|---|---|
| The power supply indicator light is not on | The power supply is not connected properly | Plug in the power supply and turn on the machine |
| Input loss is too large | The end face of the connector is dirty | Rinse the end face of the optical connector again and fix the connector. Check whether the end face is damaged |
| Switch off the main road (online) | The rollback mode is set to "no automatic rollback" and the customer firewall is not turned off | 1. Set the return mode to "automatic automatic return"<br>2. Be sure to turn off the firewall and antivirus software on the customer server, otherwise the PING packet may be filtered out |