

**SHENZHEN ATTEN TECHNOLOGY CO., LTD.**

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- Soldering Iron ●Soldering Station ●Hot Air Rework Station
- Multi-function Rework System ●BGA Rework System
- Regulated DC Power Supply ●Switching DC Power Supply
- Programmable Power Supply

# ATTEN

## TPS300P

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**High Precision Single DC Power Supply**

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**User Manual**

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**SHENZHEN ATTEN TECHNOLOGY CO.,LTD.**

Add: Floor 8,Building 2,Senyang High-tech Park,7 West Road  
High-tech Park, Guangming New district, Shenzhen 518132, China

TEL: 86-755-2697 6181

FAX: 0755-8602 1337

Website: [www.atten.com.cn](http://www.atten.com.cn)(CN)

[www.atten.com](http://www.atten.com)(EN)

Email: [sales@atten.com.cn](mailto:sales@atten.com.cn)

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SHENZHEN ATTEN TECHNOLOGY CO., LTD.

Thank you for choosing our product. Please read this manual carefully before using this product.

### Copyright Information

The design of this product (including internal software) and the accessories are protected by relevant national laws. Any violation of the relevant rights of our company will be subject to legal sanction. Please abide by relevant national laws when you use this product. Please abide by relevant national laws when you use this product.

### Description of Common Symbols

Thank you for using our products. Before using this product, please read this manual carefully and pay attention to the warnings and precautions mentioned herein.

 Warning	Failure to follow instructions may result in death or serious injury to the user.
 Note	Failure to follow instructions may result in injury to the user or substantial damage to the object.

### Essentials for Users

User should have basic knowledge of life and basic electrical operation before using the product. Underage user can only use this product under the guidance of a professional or guardian.

[Notes]: In order to avoid damage to the machine and keep the operating environment safe. Please read this manual carefully before using this product, and keep it properly for future reference.

### Safety precautions

You must observe the following basic items while using this machine to avoid electric shock, bodily injury, fire or other hazards.

In order to ensure personal safety, only the parts and accessories accepted or recommended by the original manufacturer can be used, otherwise it will lead to serious consequences!

 Warning
<ul style="list-style-type: none"> <li>• Don't use this product near combustible materials.</li> <li>• To prevent electric shock, be sure that the power line is grounded reliably before using.</li> <li>• Without instructions of professional personnel, don't use this product when lack of experience or adequate knowledge.</li> <li>• Don't use this product in a humid environment or operate this product with wet hands to prevent electric shock.</li> <li>• Don't modify this product or its accessories without the permission of our company.</li> <li>• When the spare parts need to be replaced, please use the original spare parts produced by ATTEN.</li> <li>• When this product is not needed for a short time or stopped, please be sure to shut off the power switch.</li> <li>• When the voltage in the machine is high, don't dismantle the equipment before confirmed by the professional service people.</li> </ul>

 Note
<ul style="list-style-type: none"> <li>• Don't use this power supplier when the ambient temperature is above 40°C. Enough space shall be left for vent behind the panel for heat dissipation.</li> <li>• Please confirm if the specifications of the current, voltage and power line satisfy the requirements.</li> <li>• Please shut off the power switch before connecting the equipment to power supply.</li> <li>• Don't modify this product or its accessories. Otherwise, you will lose the right to ask the manufacture for warranty. Besides, it might cause the damage of your product.</li> <li>• Don't put any heavy objects on the equipment.</li> <li>• Don't knock hard this product and its accessories, otherwise, they might be damaged.</li> </ul>

### Disclaimer

The company assumes no liability for personal injury or property loss arising from failure to follow relevant instructions, natural disasters and other force majeure or personal failures or other failures other than product nonconformity.

This Manual is collated, compiled and issued by ATTEN according to the latest product features. The product and this Manual may be subject to subsequent updating without prior notice.

### Note:

**In order to protect this product and load, please use Drp which complies with following standard:**

1. Reverse direction voltage tolerance: it is more than 2 times of this model rated output voltage.
2. Along the direction of current capacity: it is 3-10 times of this model rated output current. Please only use small loss components.
3. Due to the heat Drp caused, please do good heat dissipation. If heat dissipation is not good, this burn out DRP.

### Warning:

1. Please select a conductor with enough current capacity (meeting the rated current of this product) to connect the load.
2. High temperature may be generated near the output terminal. Please use the wire with the outer insulating layer above 85 °C.
3. Please select the wire connection load with rated voltage higher than the ground insulation voltage of this product.
4. There is a risk of electric shock when the output voltage is more than 60V. Be careful not to get electric shock. Be sure to operate carefully.

*Tip: if you are unable to determine the specification of the connecting wire, please try to select the wire connection load matching the original factory or consult the manufacturer.*

### 15. Product warranty

- Since the date of purchase of the product, we provide the purchaser with two years' quality warranty, and will provide free maintenance services for any failure of the product occurred during normal use of the product within the warranty period due to product defects.
- For products not covered by the quality warranty, we will provide maintenance services for the entire life span of the product.
- If the product user privately modifies any part of the product or improperly uses the product, which results in damage of the product, we will only offer limited maintenance service.
- In case of product failure, please send the product to designated maintenance offices for repair and maintenance. We strictly prohibit non-authorized maintenance companies and persons from maintaining and repairing the product.

### 16. After-sale contact

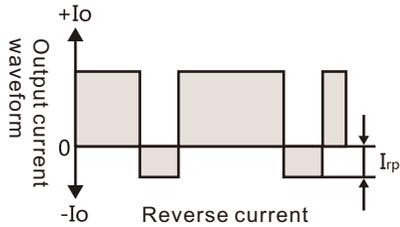
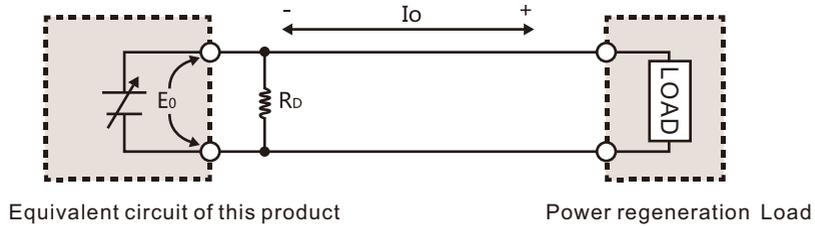
Contact number of our after-sale service department: (+86 ) 0755-23408704.

For more contact information, please visit our official website [www.atten.com](http://www.atten.com).

Product warranty card	Product Certification
<p>This product is guaranteed for two years from the date of purchase. If any quality problem is found within the guarantee period, we will respond for the maintenance free of charge on presentation of this card and the receipt. We will repair and return the repaired equipment to the customer within 2 working days of the receipt date.</p> <p>Note: This warranty card must be attached when this product is returned to the factory for maintenance, otherwise free maintenance will not be accepted. Thank you for your cooperation!</p>	<p>Produce Model: _____ Product No.: _____</p> <p>Inspector: _____ Ex-factory date: _____</p> <p>Salesperson: _____ Sold Date: _____</p>

● **Load which causes counter current**

This product cannot absorb counter current from load. When you connect to the load which may cause counter current (inverter, convertor, and transformer) output become unstable and cause fault. For this kind of load, see picture, connect resistance (R<sub>D</sub>), counter current shunt, but, flow load current will corresponding decrease I<sub>rp</sub>.



$$R_D [\Omega] \leq \frac{E_0 [V]}{I_{rp} [A]}$$

R<sub>D</sub>: Load for absorbing reverse current in parallel

E<sub>0</sub>: Output voltage

I<sub>rp</sub>: Maximum reverse current

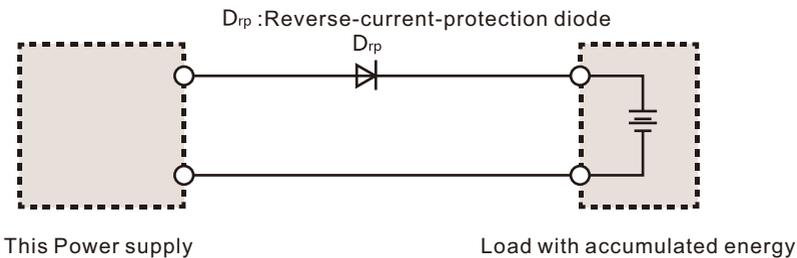
⚠ **Note:**

Please select a resistor R<sub>D</sub> with enough power. If the resistor R<sub>D</sub> used in the circuit is not powerful enough, the R<sub>D</sub> may burn out.

● **Load which causes counter current**

Connect the load which has storage energy effect, current may flow into this product internal circuit from load, may damage this product or decrease load life.

For this kind of load, see following picture, series connection one diode (D<sub>rp</sub> place) to prevent counter current between this product and load.



**Product profile**

TPS series DC numerical control constant power supply is designed by ATTEN for factory laboratories, schools, maintenance personnel and product aging and testing needs. This product has very high stability and low ripple, high power ratio, most broad voltage and current usage rate, simple operation and control, and complete protection functions.

This product is limited by the constant power limit. Taking the TPS300P as an example, the 300W capacity can output up to 75V voltage and 10A current, and automatically control the rate of change of voltage and current.

One product can replace four models of 75V \* 4A / 60V \* 5A / 50V \* 6A / 30V \* 10A, which greatly reduces repeated investment and saves cost and space greatly.

**Product specification**

Power input: Refer to the voltage mark at the rear side of this product (other input voltage can be customized).

**Rated value/dimension/weight:**

Model	Voltage adjustable scope	Current adjustment range	Output power	Weight
TPS300P	0-75V	0-10A	300W	2.5KG
Size: (L) 260mm *(W) 125mm *(H) 170mm				

⚠ **Warning** Voltage over 60VDC might cause electric shock to the user. When the power supply is connected in series, the voltage between the connection end and the grounding end will reach or above 60VDC, so the user has to be very careful.

Operating mode: Independent operating mode or tracking mode (Series or parallel).

Protection function: Over-voltage protection, Over-current protection and over-heat protection.

Service environment: 0°C~40°C, <80% (for indoor use).

Storage temperature and humidity: -10°C~70°C, <70%.

Packing List: Mainframe\*1 unit, power line \*1pcs, user manual \*1pcs.

Optional accessories: output cable, SCPI communication cable.

## Technical parameters

### Constant voltage model (CV) :

Output voltage range:Adjustable from 0 to rated voltage

Line Regulation: $\leq 0.01\% + 3\text{mV}$

Load Regulation: $\leq 0.01\% + 5\text{mV}$ (Rated current $\leq 5\text{A}$ )

Load Regulation: $\leq 0.01\% + 10\text{mV}$ (Rated current $> 5\text{A}$ )

Reaction Time : $\leq 100\mu\text{S}$ (50% load change, 0.5A minimum)

Ripple : $\leq 5\text{mVrms}$ (5Hz-1MHz)

### Constant current model (CC):

Output current range:Adjustable from 0 to rated current

Line Regulation: $\leq 0.1\% + 5\text{mA}$

Load Regulation: $\leq 0.01\% + 5\text{mA}$

Ripple : $\leq 3\text{mArms}$

### Readback display:

Display: Dual 4 bits 0.4" red Led display (voltage or current display)

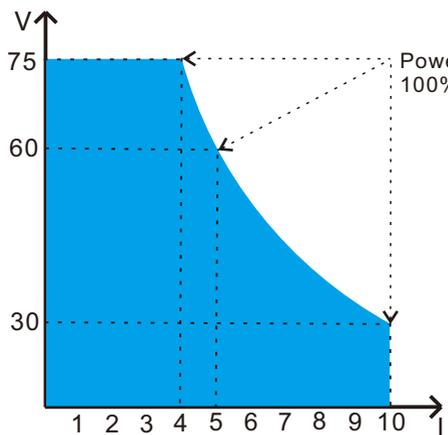
Voltage accuracy:  $\pm(0.1\% \text{ reading} + 2 \text{ bits})$

Current accuracy:  $\pm(0.2\% \text{ reading} + 2 \text{ bits})$

Voltage resolution: 10 mV

Current resolution: 10mA

### 恒功率曲线说明 :



When you set the output voltage to 75V, because the output power of the TS300P is 300W, the maximum output current at this time is  $300 \text{ (W)} \div 75 \text{ (V)} = 4\text{A}$ .

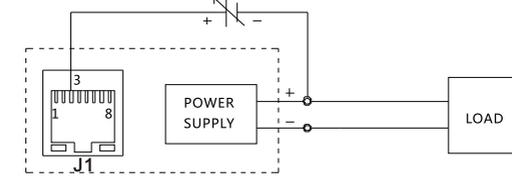
When you change the output voltage to 30V, the maximum output current value is  $300 \text{ (W)} \div 30 \text{ (V)} = 10\text{A}$ .

Next, when the output voltage is changed to 20V, according to the above method, the original output current of 15A should be obtained, but because the maximum output current of TPS300P is 10A, the maximum output current value is also 10A.

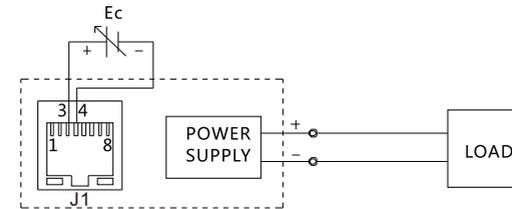
**Current remote control:** The output current of this power can be remotely controlled by an external voltage.

Connecting way as shown in Figure 2-4

- ①. Press I SET of power for 3 seconds to enter the current external control mode. Storage display window displays "S".
- ②. Calculate output current  $I_o$  with the following formula :  $I_o = (I_r \times E_c) / 10$   
 $I_o$  : The output current of the power.  $I_r$  : The rated current of the power.  
 $E_c$  : Remote control voltage  $0 \leq E_c \leq \text{About } 10\text{V}$  .
- ③. Use a stable, low noise voltage source as  $E_c$  remote control voltage.



(Figure 2-4)



## 13. Communicating function (RS232 interface)

The build-in RS232 interface of this product is isolated. Please log in our company's official website to download the relevant DEMO software and communication protocol documents.

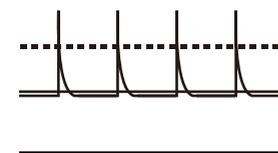
## 14. Precaution connecting load

Connecting following load may cause output unstable situation, please notice.

### ● Load which has peak value and pulse current

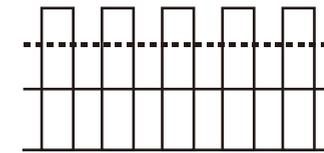
This product voltage, current display is average value. There is a possibility that panel display current value is less than setting value, however, actual current peak value is more than setting value. At this time, this product enters into instant constant current action, output voltage will become small. For this kind of load, need to increase constant current setting value, or increase capacitor capacity.

----- Constant current setting  
 ——— Ammeter reading (mean value)



Load current with peaks

----- Constant current setting  
 ——— Ammeter reading (mean value)

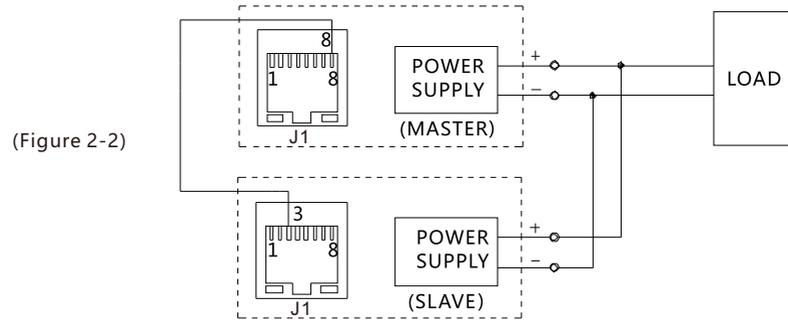


Pulse-shaped load current

## 11. Parallel mode

Connect two powers in overlap mode to provide higher voltage and an output current capacity. Refer to 2-2 Wiring Diagram.

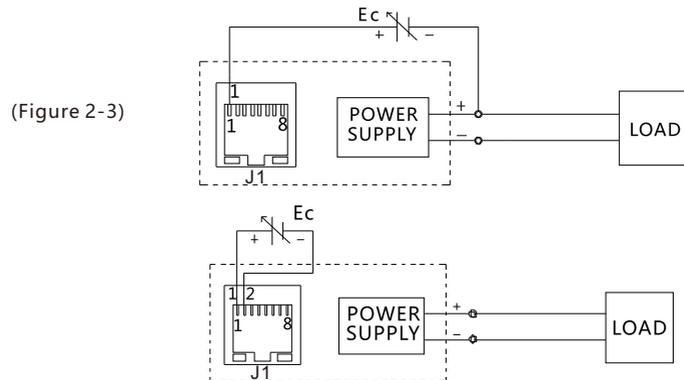
- ①. Find MASTER and SLAVE, connect these two powers according to Figure 2-2.
- ②. Turn on switch, set voltage of MASTER 0.2-0.5V lower than SLAVE.
- ③. Press the I SET button on the SLAVE power for 3 seconds to allow the SLAVE power to enter Overlap Mode.
- ④. Storage display window display " P " when SLAVE power in Overlap Mode.
- ⑤. When parallel connection, MASTER power control to perform current from 0 to rated value range. The reading of two voltmeters is added to determine the total output current.
- ⑥. The output voltage can be monitored by the power. Due to parallel connection, the voltage meter reading will be the same. Due to parallel connection, only set the voltage limit of main power.
- ⑦. Press I SET of SLAVE power for 3 seconds to exit Overlap Mode.



## 12. Remote control mode

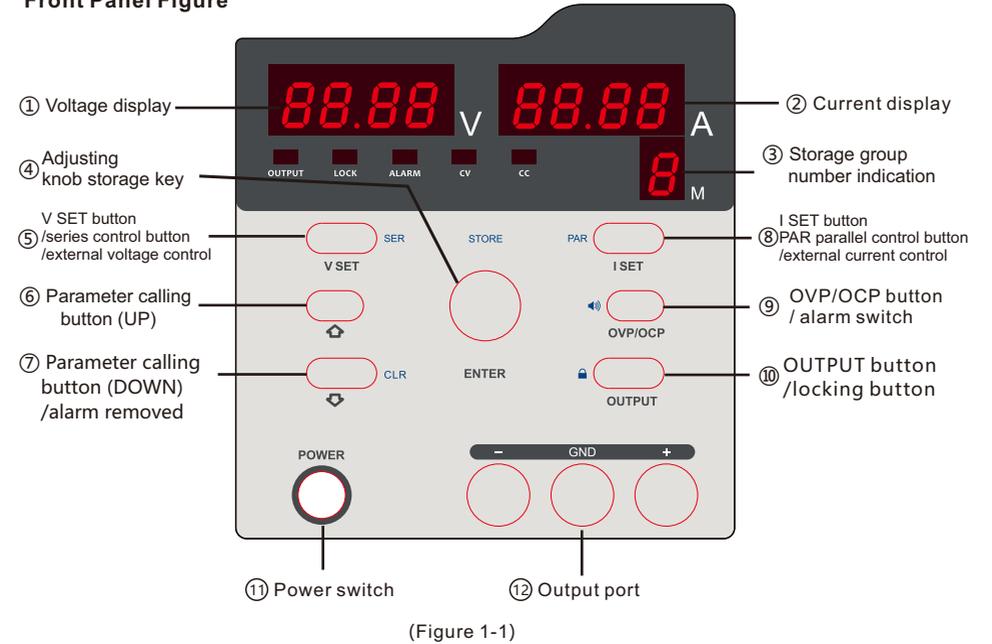
**Voltage remote control:**The output voltage of this power can be remotely controlled by an external voltage. Connecting way as shown in Figure 2-3

- ①. Press V SET of power for 3 seconds to enter voltage external control mode. Storage display window displays "S".
- ②. Calculate output voltage  $E_o$  with the following formula :  $E_o = (E_r \times E_c) / 10$   
 $E_o$  : The output voltage of the power.  $E_r$  : The rated voltage of the power.  
 $E_c$  : Remote control voltage  $0 \leq E_c \leq \text{About } 10V$  .
- ③. Use a stable, low noise voltage source as  $E_c$  remote control voltage.

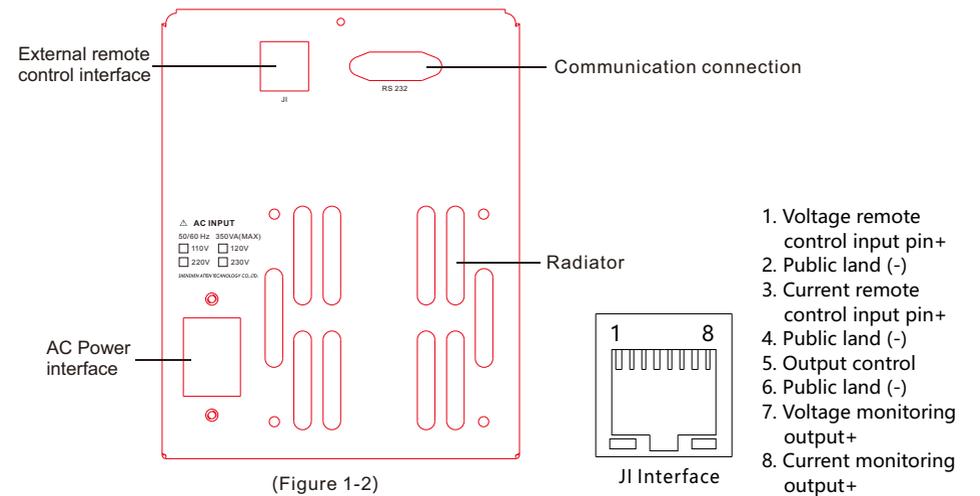


## Panel figure of this product

### Front Panel Figure



### Interface on the back



## Operating instructions

### 1. Precautions before use

**AC Power input:** AC power input shall be within 50/60HZ,  $\pm 10\%$  of the rated voltage

**Warning:** To prevent electric shock, the protective conductor of the power line must be grounded.

**Installation of instrument:** Don't use this power supplier when the ambient temperature is above 40°C. Enough space shall be left for vent behind the panel for heat dissipation.

**Note:** To prevent equipment damage, don't operate when the ambient temperature is above 40°C.

### 2. Output voltage regulation

1. Press the V SET button, the voltage interface will display the setting value voltage and the set bit will flash.
2. Press the button again, the selected bit of setting value can be changed.
3. When the setting bit is blinking, the corresponding setting value can be adjusted by rotating the button.
4. After adjustment, press the knob ENTER, the power supply will exit the voltage setting status.

### 3. Output current regulation

1. Press the I SET button, the current will display the setting value current and the set bit will flash.
2. Press the button again, the selected bit of setting value can be changed.
3. When the setting bit is blinking, the corresponding setting value can be adjusted by rotating the button.
4. After adjustment, press the knob ENTER, the power supply will exit the current setting status.

### 4. OVP/OCP Adjustment

Press the OVP/OCP button, the ALARM light will flash, and the interface will display the setting value of OVP and OCP.

#### OVP Adjustment:

1. Press the V SET button when the ALARM light is flashing to enter the OVP setting state.
2. Turn the knob to adjust the corresponding setting value. Press the V SET button to change the selected bit of setting value.
3. After adjustment, press the knob ENTER, the power supply will exit the OVP setting status.

#### OCP Adjustment:

1. Press the I SET button when the ALARM light is flashing to enter the OCP setting state.
2. Turn the knob to adjust the corresponding setting value. Press the I SET button to change the selected bit of setting value.
3. After adjustment, press the knob ENTER, the power supply will exit the OCP setting status.

### 5. Quick parameter operation

#### Parameter storage:

1. Set the value of voltage, current, OVP and OCP as per above steps.
2. Press the ENTER knob for three seconds to enter the parameter storage state. The storage memory display interface will flash.
3. Press the UP and DOWN button to adjust the target address need to be saved (address range: 0-9).
4. After adjustment, press the button ENTER to confirm storage and exit the parameter storage state.

#### Parameter calling:

1. Press the UP or DOWN button to enter the parameter calling state. The storage display interface will flash.
2. Press the UP or DOWN button again to adjust the value on the storage display interface. The voltage and current display interface will show the parameters stored in the corresponding addresses.
3. Press the ENTER knob to call the data of this group and exit the parameter calling state automatically.

### 6. OVP/OCP alarm state clearance

1. When the OVP or OCP protection appears, the corresponding indicator light of OVROCP will light up, the power supply will enter protection lock state and the output function can't be activated.
2. Press the CLR or DOWN button for three seconds to remove output protection.

### 7. Parameter unlock operation

1. Press the OUTPUT button for three seconds to lock related parameters. Now the output can be only start or closed and the LOCK light will light up.
2. Press the OUTPUT for three seconds again, the lock state will be removed and the LOCK light will go out.

### 8. Alarm on and off

Press the OVP/OCP for three seconds to start or close alarm.

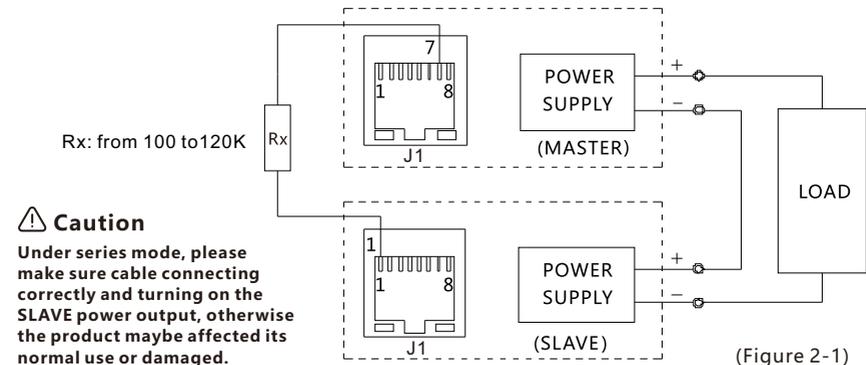
### 9. Output on or off

Press OUTPUT button to start or close output voltage.

### 10. Series Mode

Connect two powers in series system to provide higher voltage and a rated output current. Refer to 2-1 Wiring Diagram.

1. Find MASTER and SLAVE, connect these two powers according to Figure2-1.
2. Turn on the power switch and set the SLAVE current to maximum.
3. Press the V SET button on the SLAVE power for 3 seconds to allow the SLAVE power to enter Cascade Mode.
4. Storage display window display "s" when SLAVE power in Cascade Mode.
5. When series connection, MASTER power control to perform voltage from 0 to rated value range. The reading of two voltmeters is added to determine the total output voltage.
6. The load current can also be monitored by the power. The read value will be the same due to series connection. Due to series connection, only set the current limit of main power.
7. Press V SET of SLAVE power for 3 seconds to exit Cascade Mode.



MASTER: Master power supply SLAVE: Slave power supply LOAD: Connected load