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Part I. Introduction of PBP series

1.1 Description of PBP power supply

1.1.1 General information

Voltage specification:

PBP series (pulse bias power supply) can adjust the output voltage. When the output voltage does not exceed the specified range of each grade, the output voltage is constant. The output voltage can be adjusted by the pointer potentiometer (ADJUSTER potentiometer) on the front panel.

Voltage duty cycle specification

PBP series can adjust the output voltage duty cycle. it can be adjusted by the pointer potentiometer (PERCENT potentiometer) on the front panel.

Tap switch specification

PBP series has three TAP voltage output, each TAP has different voltage output range

Digital meter

PBP can measure the actual current and peak voltage at the output socket. Actual current, the peak voltage and duty cycle are shown on the front digital meter

1.1.2 Technical specifications

Function technical specifications:

Start up control mode:

The front control panel, the remote terminal controlled, the analog terminal.

Voltage output:

Output controlled by adjusting the output voltage.

Physical technical specifications:

Input voltage:	3×380Vac ± 5%, 50Hz, +N+PE.
Input relay:	three phase 40A ~ 100A relay
Output power:	the maximum output power is 20kw ~ 200kW
Output frequency:	40kHz ~ 60kHz.
Output duty cycle:	5% ~ 90% adjustable



Output voltage:	O ~1200V adjustable, contains three shift gears	
	A shift: 0~250V	≤50A-250A
	B shift: 0~800V	≤25A-150A
	C shift: 0~1200V	≤15A-50A

▲ **Note:** the above current of each gear is the output when the duty cycle is 90%. With the decrease of duty cycle, the output current will decrease proportionally!

Boundary dimension: 630 × 440 × 225mm

Weight of the machine: 40kg

Ambient temperature:

Work:

Minimum 0 °C, maximum 40 °C, (24-hour average maximum temperature: 35 °C).

Storage:

If the equipment is stored in the packing box, the operator shall be clear about the temperature of the place where it is placed and ensure that it does not exceed the maximum ambient temperature. Minimum - 5 °C, maximum 45 °C.

Transportation:

Minimum - 5 °C, maximum 45 °C.

Pollution:

The cooling air shall not contain corrosive steam, particles and electric conduction particles and moisture absorbing particles will become conductive particles.

Humidity:

Relative humidity ≤ 80%; no condensate or ice.

Atmospheric pressure:

Work:

800 mbar minimum (approximately 2000m above sea level).

Storage:

800 mbar minimum (approximately 2000m above sea level).

Transportation:

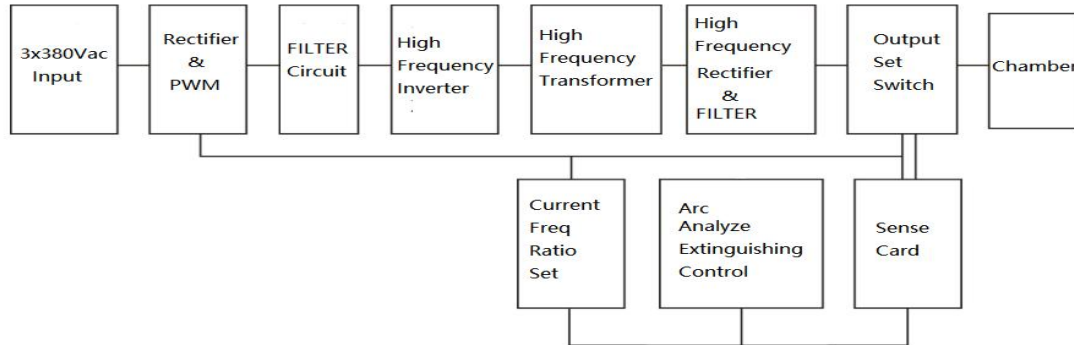
660 mbar minimum (approximately 3265m above sea level).

Cooling:

The ambient temperature is 0-45 °C; 9 inches space left behind the equipment storage, 1 inch space on the both sides and 1 inch space on the top

1.2 Control of PBP power supply

1.2.1 System block diagram



The input three-phase power supply is adjusted from the filter circuit to the DC voltage after rectification and preliminary voltage regulation, and then converted to the high-frequency oscillation through the high-frequency inverter circuit, isolated and transformed by the high-frequency transformer, and then the required amplitude is obtained from the high-frequency rectification filter link. Finally, according to the set output waveform parameters, the DC voltage is converted into the required pulse waveform by the output modulation switch. When the pulse is sent to the furnace body, the circuit will detect the pulse voltage and current parameters at any time, adjust the voltage in time to ensure the voltage is stable, The main circuit can cut off the output current within 3 microseconds to protect the workpiece from damage.

During the process of design and manufacture, the power supply fully attracted a lot of field experience and the design essence of foreign countries, thus ensuring the high reliability of the product. Because the power supply will work in high-power output state for a long time, and will continue to be impacted by the arc starting and arc extinguishing process, we reserve sufficient margin in the selection of device parameters, and the margin of key parts is more than 5 times. At the same time, all semiconductor materials are imported famous brand products, stable and reliable.

Arc detection judgment design is the key technology of our company. Due to absorbing the design experience of foreign similar products, and constantly improving on more than one hundred products, the accuracy and speed level of arc detection of our company has exceeded that of foreign products, and new development has been made in the control mode. A large number of on-site experience parameters have been set in the control circuit in our company's products, and users can meet the use requirements without any adjustment. At the same time, all the action thresholds of arc starting judgment are automatically generated, and users only need to set the required action proportion. In case of any amplitude change in the working state, the threshold will be automatically adjusted in real time, following the normal situation, without any operation of the workpiece, so the operation is convenient and reliable. At present, the arc detection time of the product is less than 0.5 microseconds, and the main circuit shutdown time is about 3 microseconds. The index parameters have reached the international advanced level.

1.2.2 Terminals

Input terminal:

AC input connection is connected with standard terminal block.

Output terminal:

There are two terminal blocks (one in red and one in black) on the rear control board, which can be connected by cable with wire diameter greater than 10 square mm and insulation voltage greater than 1KV. There is no actual limit to the length of the cable. For the location of the output power terminals.

1.2.3 Front control panel

The control functions described below enable the operation to be controlled through the PBP front control panel.

Power switch:

Turn on or off power

The digital display:

The digital meter can display the actual output voltage and current value. From left to right, current and voltage, power are displayed in sequence.

Current (power) adjusting potentiometer:

Adjusts output current (power) constant value

◆ **Attention:** Forbidden to connect the wrong input three-phase power and input voltage range $380V \pm 5\%$.

Part II. PBP power supply application

2.1 Preparation before application

Installation

Unpacking

Unpack the power supply and check it carefully. Check for actual damage. If you see any sign of shipping damage, please contact XINDA and the carrier immediately. The shipping box should be kept in order to make necessary claim to the carrier.

Cooling requirements:

PBP series power supply has water and air cooling requirements:

Requirements for air cooling mode:

- Introduce air equivalent to room temperature (up to 40 °C).
- Distribute the input air to each power supply.
- Prevent air from cycling outside each power supply.
- The discharged air shall not be returned to circulation and shall be prevented from becoming the input air.

Requirements for water cooling mode:

- The cooling water pipe shall be firmly connected to avoid water leakage and damage to the power supply.
- Cooling water inlet temperature is lower than 20 °C, cooling water pressure is 1.5-3.0kg/cm².
- Softened water shall be used for cooling water to prevent scaling. During the working process, the cooling water must be ensured to be unblocked.

Spacing requirements:

The distance between the top of the PBP and the top of the enclosure must be 1 inch (25 mm).

The distance between the back of the PBP and the back of the enclosure must be 9 inches (229 mm), and there should be enough ventilation.

2.2 Rear panel installation

Earthing

Ground connection. The earth is not an equipotential surface, and the potential of the earth changes with its position. In addition, it has another property: unlike the circuit conductor in the circuit, it will not conduct to the place where it is used. However, in order to prevent the risk of electric shock, grounding is often used as a protective measure.

The ground wire is a conductor, a group of conductors, a grounding grid or a grid in close contact with the ground to provide connection with the ground. The ground wire determines the minimum ground potential of an electrical system.

There is a protective grounding terminal at the terminal strip of the rear control panel (see the figure of the rear control panel on the attached page). Please connect the grounding post to the ground wire with a standard conductor of at least 6 mm².

◆ **Danger!** Before any wiring, the protective grounding terminal on the rear control board of PBP shall be connected with the protective grounding device / ground wire.

Connection of input three-phase electricity

The power supply needs $380 \pm 5\%$, 50Hz, three-phase five wire alternating current. There is no phase sequence, the input is 4-bit or 5-bit terminal block, and the conductor color at the terminal is in accordance with the national standard of the people's Republic of China.

The three thick lines are ABC three-phase of three-phase circuit. The thin black line is the zero line in the three-phase circuit. To connect the terminal with the input, the input circuit breaker shall be installed in the shutdown state.

Input circuit breaker

◆ **warning!** Once the wiring is completed, there is likely to be dangerous and fatal voltage at the output socket end, so the wiring shall be conducted according to the standard safety regulations before ensuring the equipment operation.

Connection of output power:

PBP power supply has 2 output terminals, please provide more than 10 square meters, and the voltage withstand is large 1kV cable connection. \ connection method:

Pulse bias power supply output mode:

Power supply rear panel red output terminal(out+) connected to equipment shell (anode)

Power supply rear panel black output terminal(out-) connected to plated workpiece (cathode)

2.3 Application method

1. Correctly connect the input and output power wiring.
2. Check the input and output wiring. After confirming that the wiring is correct, press the "power" button to start the machine and adjust the current potentiometer to the required index.

Note: Before starting the machine, make sure that the pointer of current regulating potentiometer is at zero position!

Part III. Maintenance of PBP power supply

3.1 Troubleshooting

The following troubleshooting only deals with problems with the power supply PBP. If the following methods cannot eliminate the problems, the relevant information should be recorded so that XDD engineer can help you solve the problems.

◆ **Danger!** When you repair all the functional components related to the input and output contacts, you will be exposed to fatal voltage. Before troubleshooting the power supply, ensure that appropriate safety precautions are taken.

Symptom

Recommendations

Press the front control panel switch
"Power" indicator does not light

To confirm whether the power is on
Circuit breaker connected outside the rear control panel
If the external power connector loose
Whether three-phase voltage has phase loss
Is the zero line connected
Record the current data, please contact PBP customer service department

Press the front control panel switch
The cooling fan does not turn

To confirm whether the power is on
Whether three-phase voltage has phase loss
Please contact PBP customer service

Voltage output normally
But Ammeter jitters frequently

Cleaning the workpiece
Check external insulation
Please contact PBP customer service

Power supply in operation, sudden
No voltage and current

Whether the cooling fan operates normally
Is the power cooling water on
Is high temperature of cooling water inlet
Cooling water pressure 1.5-3.0kg
Whether the power supply is lack of phase
Check whether the three-phase power supply is within $\pm 5\%$ of the rated voltage
Please contact PBP customer service department.

Ammeter does not display

Whether the power output terminal is wired
Record the current data, please contact PBP customer service department

Voltmeter jitters frequently

Whether three-phase voltage has phase loss
Check whether the three-phase power supply is within $\pm 5\%$ of the rated voltage;
Record the current data, please contact PBP customer service department.



Percentage meter jitters frequently

Cleaning the workpiece
Check external insulation
Power output short
Power output overload
Record the current data, please contact PBP customer service department.

The unit is running, but it doesn't get the expected function

Record all current voltage, current and power values. Obtain normal voltage, current and power operation values. Please contact PBP customer service.



Customer service telephone

In order to ensure the long-term and reliable operation of the products, XINDA products have all passed the factory test to ensure that users can purchase high reliable and high-quality equipment. All products sold will be guaranteed free of charge for one year.

Tel. of service department: 18098902029 13530602197

Equipment return for repair

Before returning any product for repair or adjustment, please contact customer Service Department of XINDA and discuss with them. Be sure to provide them with the equipment number and the reason for the intended return to repair. Through this consultation call, the user service department can determine whether there is a problem with the equipment that needs to be returned for repair.

If you fail to get the approval of user service department in advance to return the equipment, and the returned equipment functions normally after inspection, then you must pay the reconditioning and correction costs and all freight.

Improved equipment

The old equipment can be charged by XINDA company for improvement (according to the percentage of the current price), and the charging level shall be determined according to the service life of the equipment. The warranty period of the improved equipment is six months (the six months can be added to the rest of the original warranty period.)

Attention:

The user of this system is responsible for the safe operation of the equipment and the correct use of the equipment.

XINDA company provides the user manual about its products, but it is not responsible for the after-sale operation of the equipment or all the safety operation procedures of the equipment.



Be careful:

All personnel using or near the equipment must pay attention to prevent possible and fatal bodily injury. Do not neglect around the equipment.

Thank you for purchasing the magnetron sputtering power supply of XINDA PBP series, which is designed for use in vacuum environment. The magnetron sputtering power supply as a special power product, its design, manufacturing, scheduling and use and maintenance have great particularity. We have accumulated rich field experience in the long-term production and service process, and we will comprehensively introduce it to customers.

WARRANT TERMS

XINDA warrants to the original purchaser for a period of one year from the date of delivery, each instrument to be free from defects in materials and workmanship. For a period of one year, XDD will, at its option, adjust, repair, or replace defective parts, without charge to the original purchaser, so that the instrument performs according to its specifications. The instrument has been damaged by accident, unreasonable use, buyer-supplied software or interfacing, proper site preparation or maintenance, or abnormal conditions of operation, repairs will be billed at standard rates. In this case, an estimate will be submitted before the work is started.

In order to find out the damage during transportation or handling, you must carefully check the received goods and submit the damage report to XINDA company within 5 days after receiving the goods. Failure to submit a damage report within that time shall be deemed as the goods received by you are in good condition.

For the warranty to be valid, you must:

- ◆ Within the valid guarantee period
- ◆ Include the serial number of the product and a comprehensive description of the environment proposed in the terms
- ◆ Return authorization number assigned by customer service department of XINDA (see below)

All guarantee work shall be carried out in XINDA customer service center (see the contact number in the manual). You will be authorized to return the defective parts (see below), prepaid freight and guaranteed to return the parts to the customer service center of the company. XINDA will return the repaired parts (freight prepaid) to you by land transportation within 7 days: during the warranty period, repair parts and services are free of charge. It is the responsibility of any party (you or XINDA) transporting the parts to pack and insure them properly.

Warranty instructions

In addition to the technical requirements of XINDA, the warranty is only valid if the equipment is installed, started and used according to the operate instructions. Warranty is no longer applicable to misoperation, carelessness, consequences of accidents, or repair or modification by the third part other than authorized services. Unless otherwise agreed in writing, this clause does not represent or imply the substitution of other clauses. The warranty period of 12 months is calculated from the date of delivery of XINDA company. In any case, it is the responsibility of XINDA to identify the cause and nature of the fault, which is the final



identification.

Authorized return

Before returning to any production condition for repair or adjustment, please contact the customer service department of XINDA by telephone, discuss relevant matters, and be ready to provide them with the serial number and return reason of the product. After discussion, the customer service department of XINDA can decide whether the parts to be repaired really need to be returned.

Parts returned without the authorization of customer service department and parts returned without functional problems are not covered by this warranty. you will have to pay for retesting and adjustment, as well as freight.

Instrument upgrade

With the continuous discovery of improved methods, XINDA products are always changing. According to the aging degree of the device, the cost of upgrading is charged as a percentage of the current price. The warranty period after upgrading is 6 months (the remaining time of the original warranty period will be added). If you want to upgrade the previous instrument to the current level, please contact the customer service department of XINDA.

PBP Remote control terminal

19-pin core aviation plug

- ① Adjust the pin3 of the % potentiometer.
- ② Adjust the pin2 of the % potentiometer.
- ③ Adjust the pin3 of the potentiometer.
- ④ Adjust the pin2 of the potentiometer.
- ⑤ Adjust the pin1 of the potentiometer.
- ⑥ “+” signal of the percentage meter.
- ⑦ Common ground of percentage meter and current signal.
- ⑧ “+” signal of the Voltmeter.
- ⑨ “-” signal of the Voltmeter.
- ⑩ “+” signal of the Ammeter.
- ⑪ “+” of the Percentage table 5V supply
- ⑫ “-” of the Percentage table 5V supply
- ⑬ “+” of the Voltmeter 5V supply
- ⑭ “-” of the Voltmeter 5V supply
- ⑮ “+” of the Ammeter 5V supply
- ⑯ “-” of the Ammeter 5V supply
- ⑰ Pin “2” of the tap switch (Mid TAP)
- ⑱ Pin “3” of the tap switch(High TAP)
- ⑲ Pin “A” of the tap switch(com)

2-pin core aviation plug

- ① One end of switch for remote and local
- ② The other end of switch for remote and local

PBP analog control terminal

9-pin core aviation plug

- ①percentage analog input 0-10V setting (+)
- ②voltage analog input 0-10V setting (+)
- ③percentage read back output 0-10V(+)
- ④voltage read back 0-10V represents 0V-max output voltage (+)
- ⑤current read back 0-10V represents 0V-max output current (+)
- ⑥current,voltage,percentage,voltage setting,percentage setting com ground(-)
- ⑦ power enable one end of switch
- ⑧ power enable other end of switch
- ⑨ NC

4-pin core aviation plug

- ①Middle TAP
- ②Com GND
- ③High TAP
- ④NC