



**Instruction Manual**  
Series HB1700S  
DC stabilized power source



Please read the Instruction Manual carefully before using.



# 1 Summary

Series HB1700S and HB1701S adjustable DC voltage-stabilized sources are high precision DC stabilized power sources whose voltage and current can be continuously adjusted and stabilized voltage and current can be automatically transferred. The output voltage can be selected at random in the rated scope from 0V. The current-limiting protective point also can be selected at random and the output current can be continuously adjusted in the rated scope. The series HB1700S is single-circuit power source; HB1701S is double-circuit power source.

Among them:

- The output voltage and current of series HB1700SB are indicated by liquid crystal LED display.
- The output voltage and current of series HB1700SC are indicated by electric meter.
- The output voltage and current of series HB1700SL are indicated by LED digital meter.

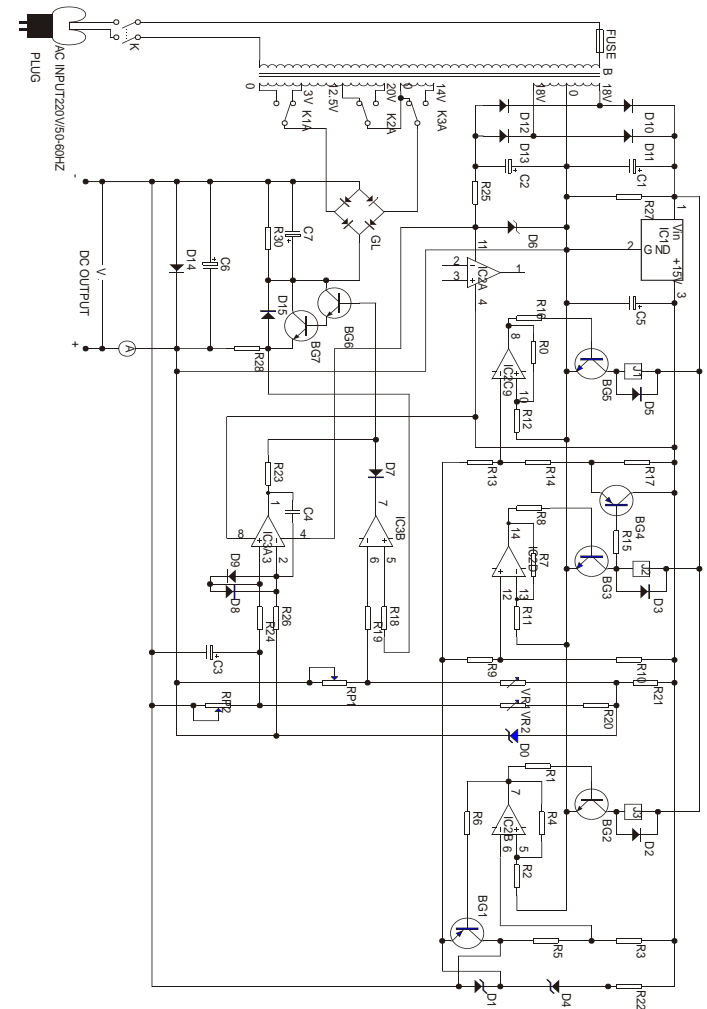
# 2 Main technical index

## I. Technical parameter

- (1.1) Input voltage: AC 220V ± 10%, 50Hz ± 5Hz
- (1.2) Output voltage: can be adjusted continuously (0-rated value)
- (1.3) Output current: can be adjusted continuously (0-rated value)
- (1.4) Power source effect:  $CV \leq 1 \times 10^{-4} + 0.5mV$   
 $Cc \leq 2 \times 10^{-4} + 1mV$
- (1.5) Load effect:  $CV \leq 1 \times 10^{-4} + 2mV$  (Output current ≤ 3A)  
 $\leq 1 \times 10^{-4} + 5mV$  (Output current > 3A)  
 $Cc \leq 2 \times 10^{-3} + 3mA$  (Output current ≤ 3A)  
 $\leq 2 \times 10^{-3} + 5mA$  (Output current > 3A)
- (1.6) Ripple and noise:  $CV \leq 10.0mVr.m.s$  (Output current ≤ 3A)  
 $\leq 15.0mVr.m.s$  (Output current > 3A)  
 $CC \leq 3mAr.m.s$
- (1.7) Protection: current-limiting protection
- (1.8) Output indication: the voltmeter and ammeter with Class 2.5 precision or the volometer with half and three-position digit

# 7 Electrical schematic diagram

(The schematic diagram is only for reference, if there is something changed, we are not responsible for notifying in addition).



## 4 General maintenance

If the power source is used in normal condition, the general maintenance is unneeded usually. If the voltage-stabilizing scope deviates from the rated value for being used for a long time, the voltage-adjusting knob can be adjusted to the max value and the voltage limiting potentiometer (RP2 or RP6) on the circuit board can be adjusted, and then the rated value of the output voltage can be added 3V or less. If the output current scope deviates from the rated value, the current-adjusting knob can be adjusted to the max value and the current limiting potentiometer (RP1 or RP5) on the circuit board can be adjusted, and then the rated value of the output value can be added 10% or less.

## 5 Completeness

Complete set of package of Model Hb1701 series includes following:

1. A main machine of Model HB1701
2. An Operation Instruction Manual
3. Two input fuse tubes of BG P520
4. A Quality Certificate
5. A Guarantee Card for the product.

## 6 Quality Guarantee

If users observe the transport, storage and qualified rules and the quality of the product is lower than the technical index within 18 months from the day the product leaving the factory, the factory is in charge of maintaining and replacing freely.

- △ 1. Strictly forbid hot-line work operated by the unprofessional personnel.
2. The company does not responsible for the problems in the aspects of safety and quality, if maintaining or replacing the parts are not provided by the company.

- and liquid crystal display, or the digital meter with higher precision.
- (1.9) Service environment: 0~+40°C, relative humidity < 90%
  - (1.10) Working time: can continuously work for long time
  - (1.11) Others: The two-circuit power source can track the main and secondary circuit. And it also can be used in series and parallel connection.

## II. Working principle

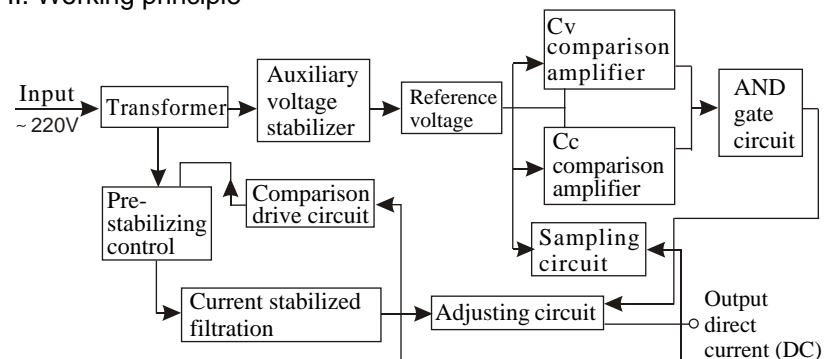


Diagram 21 Circuit functional block diagram

The main circuit makes the voltage adjusting range of the circuit widen and the precision heighten with the new design plan of suspension amplify and pre-stabilization to keep long-term stable and reliable work. The pre-stabilizing gear-shifting circuit is changed by the drive circuit through comparing the output voltage change and the auxiliary voltage-stabilized power source to make the voltage drop on the adjusting tube remain unchanged basically. That can not only guarantee the adjusting tube to be operated safely and reliably for a long time, but also improve the efficiency of the machine.

The adjusting circuit is adjusted by the series linear and controlled by the output of the voltage (current) comparison amplifier to make the output voltage (current) constant. When be in constant voltage, the voltage comparison amplifier is at the priority control state against the adjusting tube. When outputting voltage and when the original voltage value is deviated for the changing of the input voltage or the load, input the changed voltage quantity and sampling resistance to the inverted input end of the comparison amplifier. Amplify after comparing with the reference voltage set by the in-phase input end to control the adjusting tube and make the output voltage close to the original value. So then stabilize the voltage. When the circuit works in constant current, the power source comparison amplifier is at the control state and the control process is completely the same as that in the constant voltage.

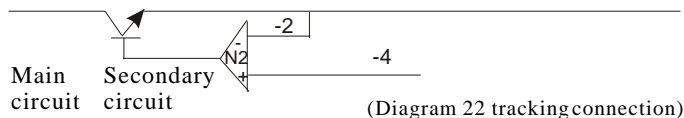
The working state of the circuit can be changed automatically. When the load is

changed in the rated scope, the circuit works at the voltage-stabilizing state. When the load exceeds the rated value or the output end is short circuit, the circuit loses voltage-stabilizing function and automatically changed into current-stabilizing state. If the load is lower than the rated value or is open circuit, the circuit will automatically change into voltage-stabilizing state.

When the circuit works at the current-stabilizing state, the current-stabilizing part is the protective circuit. When the circuit works at the voltage-stabilizing state, the voltage-stabilizing part takes the effect of voltage limiting. It is the ideal design with mutual protection.

If  $R1=R2$ , the voltage of the in-phase input end of N4 is  $(V01+V02)/2$ , and the stable output of adjusting V02 of N4 is  $(V01+V02)/2$ .  $V01=V02$ , and then the changing of secondary voltage tracking the main voltage will be realized.

When the power source is set at the tracking working state, the two groups of voltage comparison amplifiers of the internal circuit can be connected as Diagram (2-2).



## 3 Using instruction

### I. Function instruction for panel control

- ① Power switch: POWER
- ② Voltage-adjusting knob: Classified into left (main) and right (secondary) knobs that adjust respective voltage-stabilizing output separately.
- ③ Current-adjusting knob: Classified into two knobs that adjust respective current-stabilizing output separately.
- ④ Index gauge V/A: Indicate the left and right voltage or current value separately.
- ⑤ Voltage/current exchange button: The current value will be indicated by pressing the button. The voltage value will be indicated without pressing the button.
- ⑥ Tracking/independent button: It is at the independent working state without pressing the button and at the tracking working state by pressing it.

### II. Output working mode

#### 1. Independent working mode

Tracking/independent button, if setting independent, two groups of independent power sources will obtain. See Diagram 3-1.

#### 2. Tracking working mode

Tracking/independent button, if setting tracking, short connect output end “+” of the main circuit and “-” of the secondary circuit, and then a group of power source with the same output voltage value and opposite pole will obtain. See Diagram 3-2 for connecting.

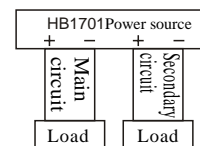


Diagram 3-1 independent state

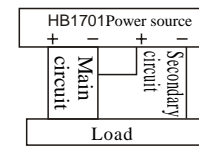


Diagram 3-2 tracking state

#### 3. Parallel working mode (using for extending the current)

Tracking/independent button, if setting independent, two circuits of output voltage should be adjusted to the using value. See Diagram 3-3 for connecting.

#### 4. Series working mode (using for extending the voltage)

Tracking/independent button, if setting independent, two circuits of output preset current will be more than the using current. See Diagram 3-4 for connecting.

#### 5. Adjust output voltage, open circuit on the output end. Adjust output current, short circuit on the output end.

#### 6. Users can ground the power source or connect into electric potential of his own system in accordance with the using environment condition and demand. See Diagram 3-5.

There are four output ends in series or main and secondary tracking working. In principle, only one end can be grounded (chassis).

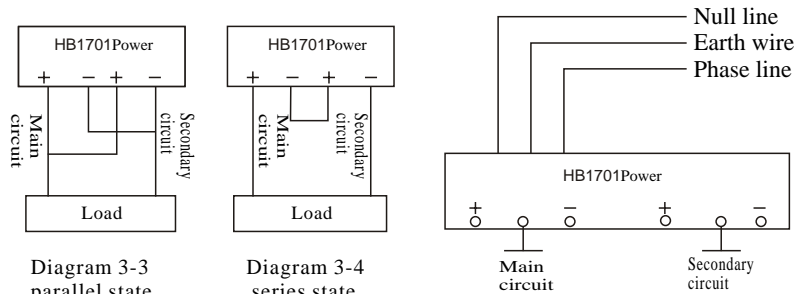


Diagram 3-3 parallel state

Diagram 3-4 series state

Diagram 3-5