Model DH l718D(E) Two-Way Tracking CV / CC

Power Supply

User's Manual

Dahua Company of Electronic Instrument in Beijing

CONTENTS

1. Descr1ption

Mode1 DHl718D(E) Two-Way CV/CC Tracking Power Supp1y is general-purpose one for laboratories. It has functions of CV/CC operations. These modes can convert automatically with change of a load. In addition, DHl7l8 also has a series master-s1ave operation function, one way on the 1eft is master way, the other on the right is slave way, in tracking state, the output voltage of the slave way changes with the master way, there fore it is especially suitable for desired symmetry and tunable bipolarity power supply. For example, Every way of DHl718D(E)-2 can provide output of 0-32V, 0-2A DC current. In series operation or series tracking operation, it can provide outputs of 0-64V, 0-2A or 0-±32V, 0-2A single polarity or bipolarity power supply. The output of every way has a high Q magneto-electric meter as an output parameter indication. This power supply has characteristics of convient and efficient uses not fear to short, keeping constant current in short circuit.

There is a grounded binding post at the output termina1 of every way on the panel; this grounded binding post can connect the power supply with grounded potential of user systems. Overall output power is more than l24W.

Model DH17l8D(E) design is new reasonable and beautiful and its color is unique. It is especially used in the fields of laboratories, production scientific research, experiments and teaching.

This power supply has won a good reputation among users owing to its excel1ent performance / price ratio.

Before you operate this power supply, please read this operating manua1 carefully.

2. Performances and Specifications

Model		DH1718-2	DH1718-3	DH1718-4	DH1718-5
Output(two-way)	Voltage	0-32V	0-60V	0-32V	0-32V
	Current	0-2A	0-1A	0-3A	0-5A
Input 220V±10%, 50Hz±5%		＜ 250VA	＜ 250VA	＜ 400VA	＜ 600VA
Load Effect	CV	1×10^{-4}+2mV	2×10^{-4}+2mV	5×10^{-4}+2mV	5×10^{-4}+2mV
	CC	20mA	20mA	20mA	20mA
Source Effect	CV	1×10^{-4}+2mV	2×10^{-4}+2mV	5×10^{-4}+2mV	5×10^{-4}+2mV
	CC	1×10^{-4}+5mA	2×10^{-4}+5mA	5×10^{-4}+5mA	5×10^{-4}+5mA
Ripple and Noise (rms)	CV	0.5mV	0.5mV	1mV	2mV
	CC	1mA	5mA	5mA	10mA
Output Setting Resolution (typical)	CV	20mV	40mV	20mV	20mV
	CC	50mA	25mA	70mA	120mA
Mutual Effect	CV	5×10^{-4}+2mV	5×10^{-4}+2mV	5×10^{-4}+2mV	5×10^{-4}+2mV
	CC	＜ 0.5mA	＜ 0.5mA	＜ 0.5mA	＜ 0.5mA
Tracking Error		5×10^{-3}±2mV			
Transient Recovery Time		20 mV; 50μs			
Indicating Accuracy of Meter		Voltage 2.5 grade (D) / ±1%rdg + 6dgts (E)			
		Current 2.5 grade (D) / ±2%rdg + 10dgts (E)			
Temperature Range		Operating Tempera 0 ℃ ~+ 40 ℃			
		Storage Temperature 5 ℃ ~+ 45 ℃			
Reliability MTBF(θ)		≥5000H			
Cooling Mode		Natural Ventilation			
Dimensions (mm) 205(W)×160(H) ×	(L)	305	305	305	500
Weight (kg)	About	9	9	9	15

3.Operating Principle

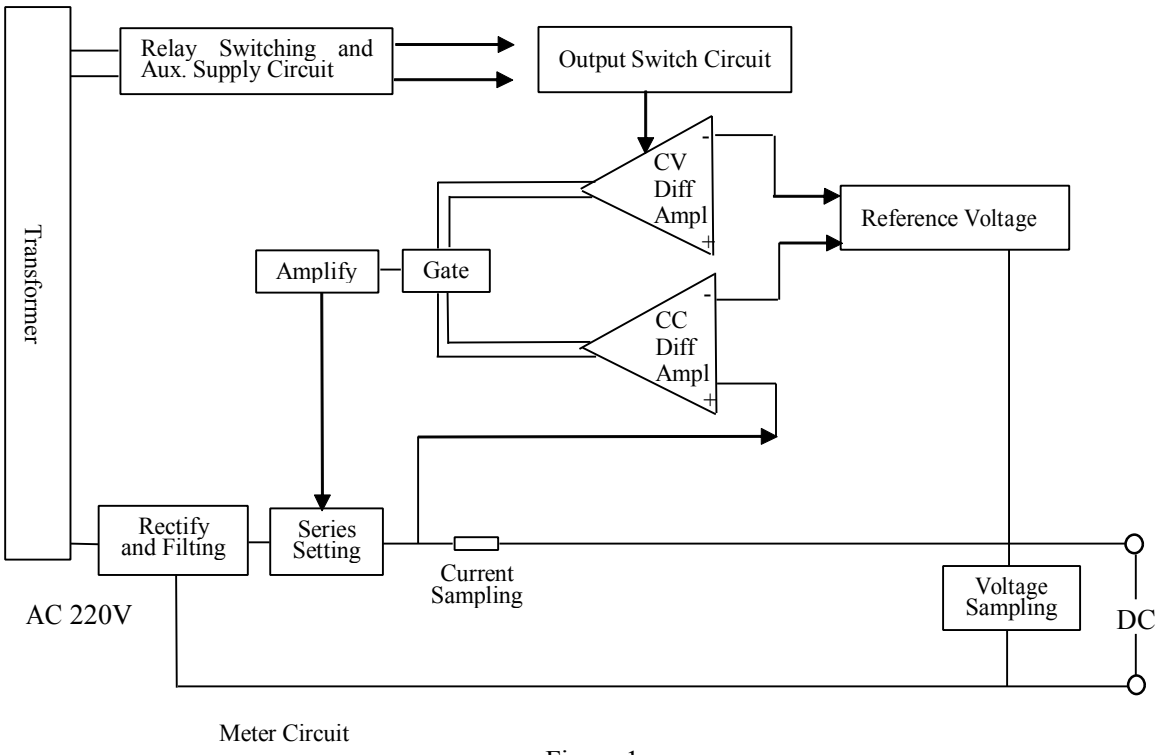

Figure 1

(1) Switching Principle

Because the changing range of the output voltage is bigger, the secondary of the transformer provides the output of AC voltage, after it is transferred then app1ied to the rectifier. This procedure is accomplished by the switching control circuit and driver circuit.

(2) Mutual Transfer Principle of CV / CC Operation

When CV is operating, the voltage comparison amplifier is in prior control state for the regulator. When the output current of CV operation reaches setting value of CC point, CC comparison amplifier is in prior control state for the regulator. The operation mode of the circuit converts CV to CC.

Fig 2 shows the characteristics of the switching procedure.

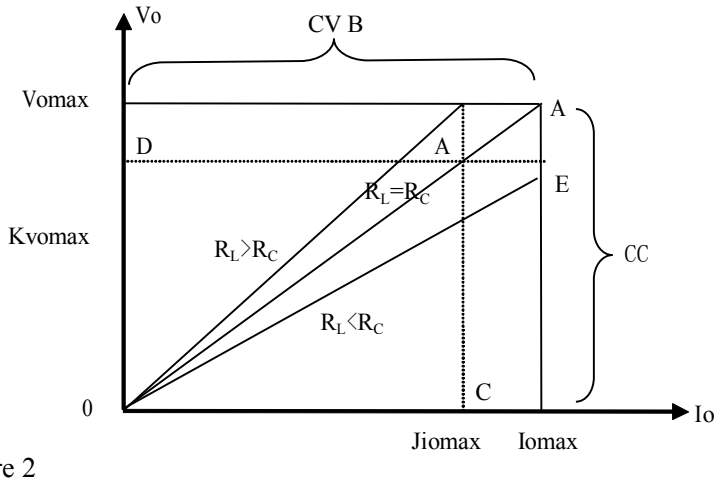

Figure 2

The load value of the conversion point is $R_L = R_C = KV_{omax} / I_{omax}$, where $0 \leq K/J \leq 1$.

When K = J, the max output power of the power supply is $R_L=R_C=V_{omax} / I_{omax}$. Setting that remains constant.

When K >J, the circuit is operating in CC state. The point A will move to A' on BC line.
When K <J, the circuit is operating in CV state. The point A will move to A' on DE line.
Setting that K and J are constant, assuming they are all equal to 1, i.e R = J= l, R_L varies, also the circuit can be converted to the certain B point of CV operation line or certain E point of CC operating region.
By above mentioned, we can know the crossover, point of CC / CV operating modes, they depend on the setting of the output parameters to change, suck as changing K and J values, on the other hand, they can be changed by changing the relation between the load and critical load R_C, but the mode conversion is accomplished by the built-in electronic circuit itself at last.
An ideal conversion region should be a point, but in fact, it is impossible, from the point of view of math, this is because in this point, the change of the output voltage or output current is discontinuousness, in practical conversion procedure, there is a conversion crossover region, of course, the smaller, the crossover region is, the better conversion characteristics of CV / CC are.

(3) Adjusting Circuit

The adjusting circuit is a series linearly controller, which is controlled by an error amplifier to adjust the output parameters linearly.

(4) Comparison Amplifier

For adjusting grade, the feeding mode of the comparison amplifier is full-float mode. The advantage of the circuit is that it has a wide adjustment range, high accuracy, simple circuit, high reliability and not fears to overload or short.

(5) Reference Source

It consists of a 2DW7C type reference voltage diode with zero temperature coefficients; it features simple, reliable circuit, high accuracy and stability.

(6) Indicating Circuit

It consists of two magnetic-electric meters with high sensitivity, which can be controlled by the key controllers on the panel. The indicating accuracy is 2.5 grades.

(7) Operating Principle of Series Master-Slave Tracking

The schematic diagram is shown as Figure3.

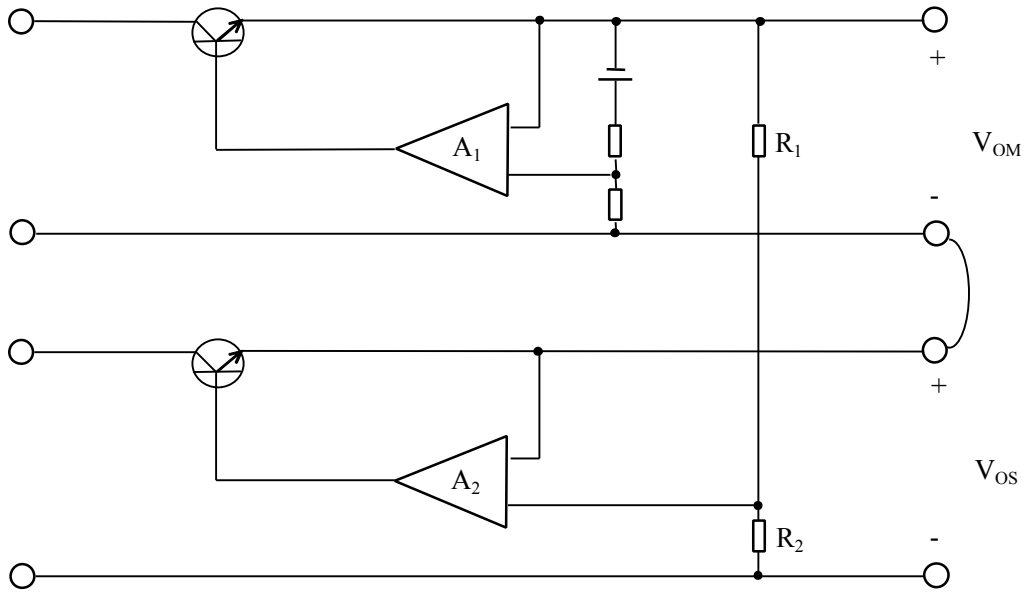

Figure 3

If R1 = R2, when the output voltage across the two input terminals is V_{in}= 0, it must be $V_{os} = V_{omo}$, i.e

the output of the slave varies with the output changes of master.

4. Configuration

5.

Applications

(1) Front Panel Show

Volt	Voltmeter	Indicating the output voltage
Amps	Ammeter	Indicating the output current
Voltage	Voltage setting	Adjusting the output of CV
Current	Current setting	Adjusting the output value of CC
Tracking	Tracking operation	Series tracking operation knob
Independent	Non-tracking	
GND	Ground terminal	Case grounded blinding post
Connect for tracking line series tracking operation	Connection in	Series short connection tracking operation

(2) Operating Instructions

l) The key on the left is a function selector of meter indication of the left way. When pressed, it will indicate the output current of this way otherwise, indicates the output voltage, the key on the right is the same as mentioned above.

2) The key in the middle is a tracking / normal selector switch, pressing the key, a short connection line is added between the negative output terminal of the left way and lh. positi'e and the positive terminal of the right way. After power on, the instrument begins operation in master-slave tracking state.

3) The output voltage is set when the output terminal is open circuit; the output current is set when the output terminal is circuit-shorted.

(3) Ground Connection Method

1) G round schematic diagram or the power supply is shown in Fig4.

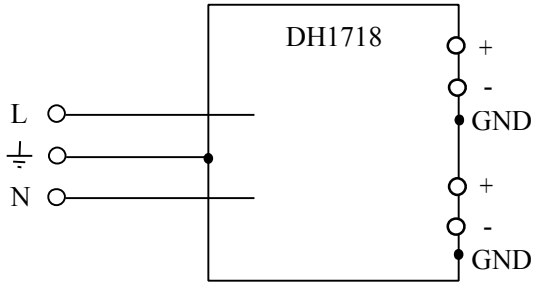

Figure 4

Users can connect this power supply to ground or into their own system grounded potential according to their use cases.
2) 1 series operation or series master-slave tracking operation, in principle, one terminal of four output terminals of the two ways is only allowed to connect with the cabinet.
3) The benefit of ground connection is safe, further it can decrease ripples and harmful spurious wave and 50Hz interference caused by grounded, potential difference.

6. Maintenance

1) Period Check: Should make period inspection after the instrument operation a long-time, the operating, performances of the unit would have some changes, therefore users should make inspection for this instrument. Procedure as below:
a. Voltage and current output range
b. Indicating accuracy of the meter
2) General Calibration
a. Adjustable component functions of PCB (see Fig.5)

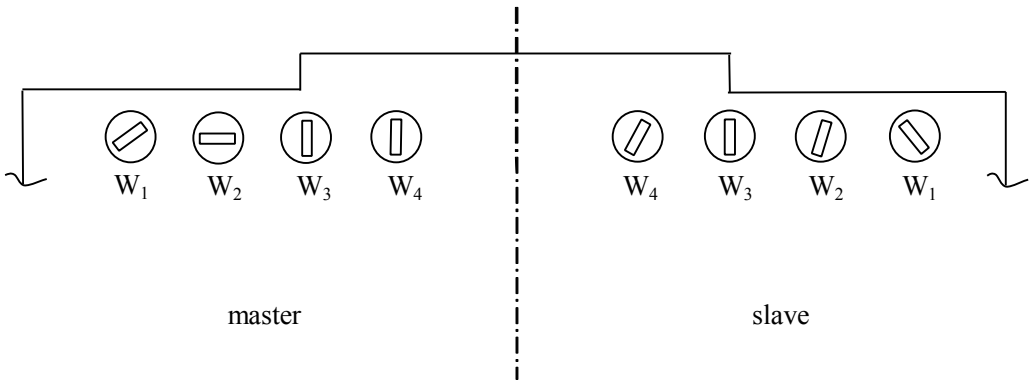

Figure 5

W1, Max. Range limit of the output voltage
W2, Max. Range limit of the output current
W3, Accuracy calibration of ammeter
W4, Accuracy calibration of voltmeter
b. Mechanical Zero Calibration of the Meter
When the meter pointer deflected to mechanical zero point, a screw driver can be used to rotate "Mechanical Zero" button below the meter on the panel making it recovery.
c. Ca1ibration of Output Voltage Range
A digital voltmeter is applied to the corresponding output terminal; the output voltage is set to max. Then W1 is set to make the readings in the digital meter indicated to $32.5V \leq V_{omax} \leq 32.7V$, meanwhile, you can observe indicating value of the voltmeter such as the indication value of the deflected digital voltmeter and can trim potentiometer W4 in coincidence with the readings as possible.
d. Calibration o f Output Current Range
A 5W standard resistor is connected across the output terminal; the voltage output of the circuit under test on the panel is set to min, but the current output to max. The digita1 voltmeter is collected across 1Ω resistor, again power is on, and the output voltage is set to max. Until the readings on the digital meter remain constant basically. At this time the circuit is operating in CC state, W2 is adjusted, the voltage on the digital meter is:

$2.2V \leq I_{omax}$ 'R (=lΩ)≤2.25V

Meanwhile, should observe whether the current indication value of until is in ordnance with the readings on the digital meter, otherwise should trim W3.

NOTE: The output voltage and current can not be set too large, if the readings exceeded the given specifications, the faults will occur.

Model	DH1718-2	DH1718-3	DH1718-4	DH1718-5
Vomax	33V	61V	33V	33V
Iomax	2.25A	1.25A	3.25A	5.25A

7. Completeness

Overall DH1718 includes:

l) DH17l8 (master) 1

2) Operating manual 1

3) Input fuse holder BG XP φ5x 20 1

Model	DH1718-2	DH1718-3	DH1718-4	DH1718-5
Fuse	2.5A	2.5A	4A	5A

Connection strap for tracking operation

8. Storage

Model DH1718 should be stored at the temperature 5-45℃, relative humidity ≤ 80% in vellti1ated room without smoke, gas, acid, alkali as well as gas and volatile solvent, dust.

9. Quality Guarantee

After delivery within l8 months, if users abide by the regulations of transportation, storage and applications, but the quality is poorer than given specifications, our factory is responsible for repairs and replacement free of charge.