VOLTCRAFT

ESP Series Single Output DC Power Supply Operating Instructions

Item No.: 3760665 (ESP-310)

Table of Contents

1. General Safety Requirements 1

2. Safety Terms and Symbols 2

3. Quick Start 3

3.1 Panel and Interface 3
3.1.1 Front Panel 3
3.1.2 Rear Panel 4
3.1.3 User Interface 5
3.2 General Inspection 5
3.3 Power Inspection 6
3.4 Output Inspection 6
3.4.1 Voltage Output Inspection 6
3.4.2 Current Output Inspection 7

4. Panel Operation 8

4.1 Turn On/Off the Channel Output 8
4.2 Set the Output Voltage/Current 8
4.3 Over Voltage/Current Protection 8
4.4 Memory Key Shortcut Settings 9
4.4.1 Quick Save and Recall Operation Example 9
4.5 Meter Function (Display Readback) 10

5. Technical Specifications 11

6. Troubleshooting 13

7. Appendix 14

7.1 Appendix A:Accessories 14
7.2 Appendix B: General Care and Cleaning 14
7.3 Appendix C: Line Fuse Replacement 15

1. General Safety Requirements

Before use, please read the following safety precautions to avoid any possible bodily injury and to prevent this product or any other connected products from damage. To avoid any contingent danger, ensure this product is only used within the ranges specified.

Only a qualified person should perform internal maintenance.

To avoid Fire or Personal Injury:

- **Use Proper Power Cord.** Use only the power cord supplied with the product and certified to use in your country.
- **Product Grounded.** This instrument is grounded through the power cord grounding conductor. To avoid electric shock, the grounding conductor must be grounded. The product must be grounded properly before any connection with its input or output terminals.
- **Check all Terminal Ratings.** To avoid fire or shock hazard, check all ratings and markings on this product. Refer to the user manual for more information about ratings before connecting to the instrument.
- **Do not operate without covers**. Do not operate the instrument with covers or panels removed.
- **Use the Proper Fuse.** Use only the specified type and rating fuse for this instrument.
- **Avoid exposed circuit**. Be careful when working on exposed circuitry to avoid risk of electric shock or other injury.
- **Do not operate if any damage.** If you suspect damage to the instrument, have it inspected by qualified service personnel before further use.
- **Use your instrument in a well-ventilated area.** Please keep well ventilated and inspect the intake and fan regularly.
- **Do not operate in damp conditions.** To avoid short circuiting to the interior of the device or electric shock, please do not operate in a humid environment.
- **Do not operate in an explosive atmosphere.** To avoid damages to the device or personal injuries, it is important to operate the device away from an explosive atmosphere.
- **Keep product surfaces clean and dry.** To avoid the influence of dust or moisture in air, please keep the surface of device clean and dry.

2. Safety Terms and Symbols

Safety Terms

Terms in this manual (The following terms may appear in this manual):



Warning: Warning indicates conditions or practices that could result in injury or loss of life.



Caution: Caution indicates the conditions or practices that could result in damage to this product or other property.

Terms on the product. The following terms may appear on this product:

Danger: Indicates an immediate hazard or injury possibility.

Warning: Indicates a possible hazard or injury.

Caution: Indicates potential damage to the instrument or other property.

Safety Symbols

Symbols on the product. The following symbols may appear on the product:



Hazardous Voltage



Refer to Manual



Protective Earth Terminal



Chassis Ground



Public Ground

3. Quick Start

3.1 Panel and Interface

3.1.1 Front Panel

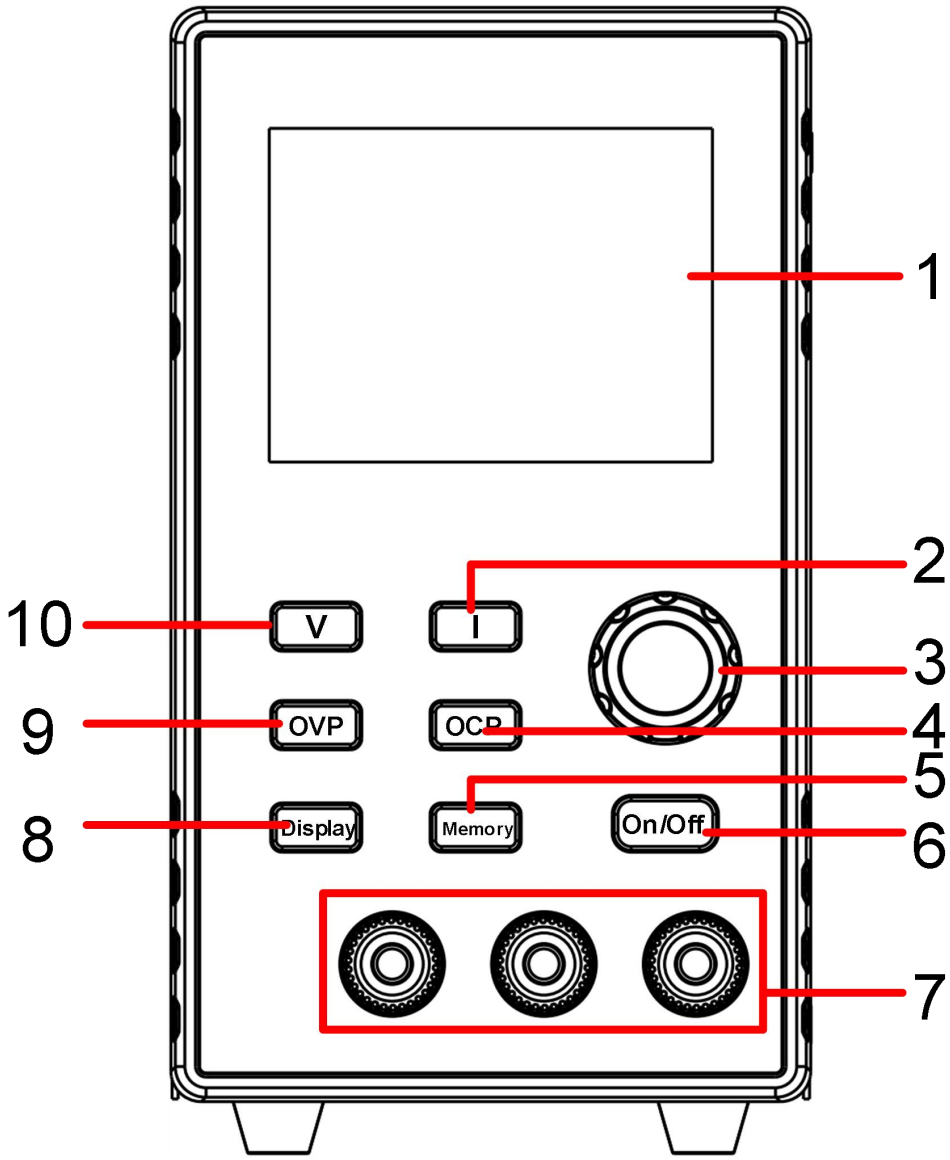


Figure 3- 1 Front Panel Overview

1	**Display Area**	Display user interface.
2	**I - Current Key**	Set current parameters, press to move the cursor when editing parameters.
3	**Knob**	Select the main menu or change the value, function equals to the confirmation key.
4	**OCP - Over Current Setting Key**	Set over current protection parameters, press to move the cursor when editing parameters.

5	**Memory Key**	Short press to recall preset; long press for 1.5 seconds to save preset value.
6	**On/Off Key**	Turn on/off the channel output.
7	**Channel Output Terminal**	Output access of channel.
8	**Display Key**	Setting and display switch key.
9	**OVP - Over Voltage Setting Key**	Set over voltage protection parameters, press to move the cursor when editing parameters.
10	**V - Voltage Key**	Set voltage parameters, press to move the cursor when editing parameters.

3.1.2 Rear Panel

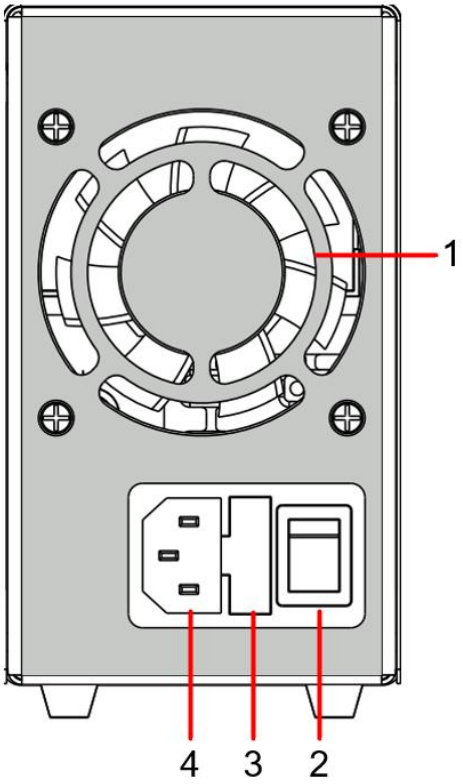


Figure 3- 2 Rear Panel Overview

1	Air Vent	Air vent.
2	Power Button	Turn on/off the instrument.
3	Fuse	Power fuse.
4	AC Power Input Jack	AC power input interface.

3.1.3 User Interface



Figure 3- 3 User Interface

Key Indicator Description

RUN	Indicator on: Output is enabled (ON state). Indicator off: Output is disabled (OFF state).
CC	Indicator on: Operating in constant current (CC) mode. Indicator off: Operating in constant voltage (CV) mode.
Meter	Indicator on: Display shows output readback values. Indicator off: Display shows voltage and current setting values.

3.2 General Inspection

After you get a new power supply, it is recommended that you should make a check on the instrument according to the following steps:

1. **Check whether there is any damage caused by transportation.**

   If it is found that the packaging carton or the paper tray protection cushion has suffered serious damage, do not throw them away first till the complete device and its accessories succeed in the electrical and mechanical property tests.

2. **Check the Accessories**

   The supplied accessories have been already described in the "Appendix A: Enclosure" of this Manual. You can check whether there is any loss of accessories with reference to this description. If it is found

that there is any accessory lost or damaged, please get in touch with the distributor of our responsible for this service or our local offices.

3. **Check the Complete Instrument**

   If it is found that there is damage to the appearance of the instrument, or the instrument can not work normally, or fails in the performance test, please get in touch with our distributor responsible for this business or our local offices. If there is damage to the instrument caused by the transportation, please keep the package. With the transportation department or our distributor responsible for this business informed about it, a repairing or replacement of the instrument will be arranged by us.

3.3 Power Inspection

(1) Use the power cord supplied with the accessories to connect the instrument to the AC power.

> **Warning:**
> To prevent electric shock, make sure that the instrument is properly grounded.

(2) Press the **power button** on the front panel, the button light will be on, and the startup screen will be displayed on the screen.

3.4 Output Inspection

Output inspection is to ensure that the instrument can achieve its rated outputs and properly respond to operation from the front panel. For the procedures below, it is suggested that you read "*Turn On/Off the Channel Output*" on page 8 and "*Set the Output Voltage/Current*" on page 8.

3.4.1 Voltage Output Inspection

The following steps verify basic voltage functions without load:

(1) When the instrument is under no load, select a channel and ensure the output current setting for this channel is not at zero.

(2) Turn on the channel output, then ensure the channel is in Constant Voltage output mode.
(3) Set some different voltage values on this channel; check if the actual voltage value displayed is close to the set voltage value, and also that the actual current value displayed is nearly to zero.
(4) Check that if the output voltage can be adjusted from zero to the maximum rating.

3.4.2 Current Output Inspection

The following steps check basic current functions with a short across the power supply's output:

(1) Power on.
(2) Connect a short across (+) and (-) output terminals with an insulated test lead on this channel. Use a wire size sufficient to handle the maximum current.
(3) Set the output voltage to the maximum rating on this channel.
(4) Turn on the channel output. Ensure the channel you used is in Constant Current output mode.
(5) Set some different current values on this channel; check if the actual current value displayed is close to the set current value, and to check if the actual voltage value displayed is nearly zero.
(6) Check that if the output current can be adjusted from zero to the maximum rating.
(7) Turn off the channel output and remove the short circuit from the output terminals.

4. Panel Operation

4.1 Turn On/Off the Channel Output

Press the **On/Off** key to turn on/off the channel.

4.2 Set the Output Voltage/Current

In the channel setting area, press **V** / **I** key to select and flash the rightmost digit of the corresponding voltage/current row on the digital display. After setting the output voltage/current value, turn the knob to adjust the value of the flashing digit. Press **V** / **I** key to move the flashing position digit by digit from right to left.

4.3 Over Voltage/Current Protection

Overvoltage protection (O.V.P) or overcurrent protection (O.C.P): after the output is turned on, once the output voltage/current reaches the set value of O.V.P/O.C.P, the instrument will cut off the output, a warning will show on the screen.

Note:
When the instrument disables the output due to protection, after you make some adjustments, the channel must be restarted to output normally.

This function can keep the power output from exceeding the load rating to protect the load.

In the channel setting area, press **OVP** / **OCP** key to enter OVP and OCP settings:

Voltage row: displays the OVP or OCP indicator.

Current row: displays the current OVP/OCP threshold and the entire row flashes.

Turn the knob to adjust the OVP/OCP threshold values. Press **OVP** / **OCP** key,

press the knob, or wait for the 5-second timeout to save and exit.

4.4 Memory Key Shortcut Settings

Press **Memory** key on the front panel to recall or save 3 groups of channel parameters: M-01, M-02, M-03. These are used for quick preset recall and output, enabling fast switching between common operating points.

Recall Operations:

(1) In normal display mode, press **Memory** key.
- Voltage row: voltage preset value of this group.
- Current row: current preset value of this group.
- Power row: "M-01" (shows current preset group number).

(2) Turn the knob to switch group numbers: M-01 ↔ M-02 ↔ M-03.

(3) Press the knob to confirm selection.

Save Preset Operations:

(1) Press **Memory** key about 1.5 seconds.

(2) Save the current set V_Set_Target and I_Set_Target to the current group.

(3) The voltage row displays "SAVE" and automatically exits to normal display after 1 second.

4.4.1 Quick Save and Recall Operation Example

Scenario: save the current 12.00V / 2.00A to M-02.

(1) First set the voltage to 12.00V (edit digit by digit using **V** key).

(2) First set the current to 2.00A (edit digit by digit using **I** key).

(3) Press **Memory** to enter Memory mode,display "M-01".

(4) Turn the knob clockwise to switch to "M-02".

(5) Press and hold **Memory** for about 1.5 seconds until "SAVE" appears and then save successful.

When recalling:

(1) Press **Memory** to enter Memory mode.

(2) Turn the knob switch to "M-02".

(3) Press the knob to recall, and the output will immediately be 12.00V/2.00A.

4.5 Meter Function (Display Readback)

Press **Display** key to toggle between setting value and readback value display.

- When the voltage / current digital tube shows the readback value, the Meter indicator lights up.
- When the voltage / current digital tube shows the setting value, the Meter indicator turns off.

5. Technical Specifications

The instrument must be operated continuously for more than 30 minutes at the specified operating temperature to achieve the following specifications.

Model	ESP-310
Input Characteristics	
Supply Voltage	198V-240 V/AC
Input Frequency	50/60 Hz
Input Fuse	250V, F5A
Rated Output	
Voltage	0~30V
Current	0~10A
Power	300W
Regulation(CV)	
Load	0.1%±3mV
Line	0.1%±3mV
Regulation(CC)	
Load	0.2%±3mA
Line	0.1%±3mA
Ripple & Noise (Noise bandwidth 20MHz, ripple bandwidth 1MHz, connect 10uF electrolytic capacitor in parallel with 0.1uF ceramic capacitor to the output terminal for testing)	
Voltage (Vp-p)	0.3%Vp-p
Current (Arms)	0.3%Irms
Setting Resolution	
Voltage	10mV
Current	1mA
Readback Resolution	
Voltage	10mV
Current	1mA
Setting Accuracy	
Voltage	≤0.2%±0.2%FS
Current	≤0.2%±0.2%FS
Readback Accuracy	

Model	ESP-310
Voltage	≤0.2%±0.2%FS
Current	≤0.2%±0.2%FS
Response time	
Transient recovery time (10%~90% rated load)	≤5.0ms
Protective function	
OVP	0~31V
OCP	0~11A
OTP	85℃
Temperature coefficient of output	
Voltage	100ppm/℃
Current	200ppm/℃
Temperature coefficient of readback value	
Voltage	100ppm/℃
Current	200ppm/℃
Display	
Display Type	3 x 4bit LED
Environment	
Temperature	Working Temperature: 0℃～40℃ Storage Temperature: -20℃～60℃
Relative Humidity	≤90%RH; no condensation
Height	2,000 meters
Cooling	Fan cooling, temperature intelligent speed control
Others	
Dimension	82mm(Width)× 142mm(Height)×226mm(Depth)
Weight	Approx. 1.5kg

6. Troubleshooting

Item	Error Code	Error Information
1	Err.1	Output overcurrent (OCP)
2	Err.2	Output overvoltage (OVP)
3	Err.3	Output overpower (OPP)
4	Err.4	Over temperature protection (OTP)
5	Err.5	Under temperature protection (LTP)

7. Appendix

7.1 Appendix A:Accessories

(The accessories subject to final delivery.)

- Power Cord
- EN Manual
- DE Manual
- Safety Hintsheet

7.2 Appendix B: General Care and Cleaning

General Care

Do not store or leave the instrument where the liquid crystal display could be exposed to direct sunlight for long periods of time.

Caution: To avoid any damage to the instrument, do not exposed it to any sprays, liquids, or solvents.

Cleaning

Inspect the instrument as often as operating conditions require. To clean the instrument exterior, perform the following steps:

1. Wipe the dust from the instrument surface with a soft cloth. Take care not to scratch the transparent LCD protection screen when cleaning.
2. Disconnect power before cleaning your instrument. Clean the instrument with a damp soft cloth (not dripping with water). It is recommended to clean with soft detergent or fresh water. To avoid damage to the instrument, do not use any corrosive chemical cleaning agents.



Warning: Before re applying power, ensure that the instrument is completely dry, avoiding any electric shock or electrical short circuit resulting from moisture.

7.3 Appendix C: Line Fuse Replacement

The line fuse is in the plastic fuse box on the right side of the power line input on the rear panel.

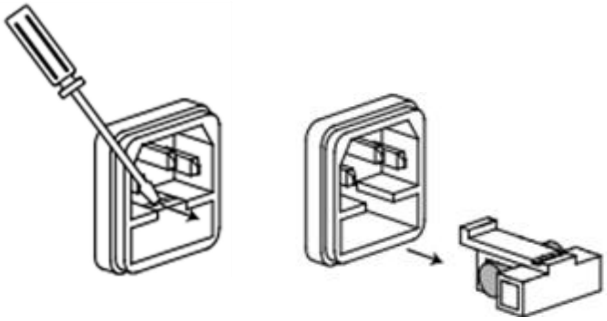
Warning: Disconnect the line cord at the rear panel and remove all test leads connected to the instrument before replacing the line fuse. Failure to do so could expose the operator to hazardous voltages that could result in personal injury or death.

Use only the correct fuse type. Failure to do so could result in personal injury or instrument damage.

Voltage	Fuse
198 - 240 V AC	5A / 250V, glass tube, D5.2*20

To perform the line fuse replacement, follow these steps:

1. Turn off the multimeter, remove all measurement leads and other cables from the instrument, including the power cord.
2. Use a flat-blade screwdriver to remove the fuse box.



3. Replace the fuse with a new one, which should match with the voltage; install it into the fuse box, and push the fuse box back on to the rear panel.

