VOLTCRAFT

DSP Series 500W Single Channel Output DC Power Supply User Manual

Item No.: 3368776 (DSP-8020)

Item No.: 3451553 (DSP-15010)

Item No.: 3451554 (DSP-30005)

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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 Review

3.1 Panel and Interface

3.1.1 Front Panel



Figure **3-1** Front Panel Overview

1	Over Voltage Setting Key	Set over voltage protection parameters, press to move the cursor when editing parameters.
2	Voltage Key	Set voltage parameters, press to move the cursor when editing parameters.
3	Current Key	Set current parameters, press to move the cursor when editing parameters.
4	Over Current Setting Key	Set over current protection parameters, press to move the cursor when editing parameters.
5	Knob	Select the main menu or change the value, function equals to the confirmation key.
6	Memory Key	4 sets of channel parameters can be stored for quick output, or long press to enter the List waveform output editing interface.
7	On/Off Key	Turn on/off the channel, or long press to turn on or turn off the power-on automatic startup function.
8	Channel Output Terminal	Output access of channel.
9	Display Key	Number display and curve display switch key.

10	USB Port	USB charging port (no read/write function) 5V/1A charging.
11	Display Area	Display user interface.

Button light instruction

On/Off key: The key lights up when the channel turns on.

3.1.2 Rear Panel

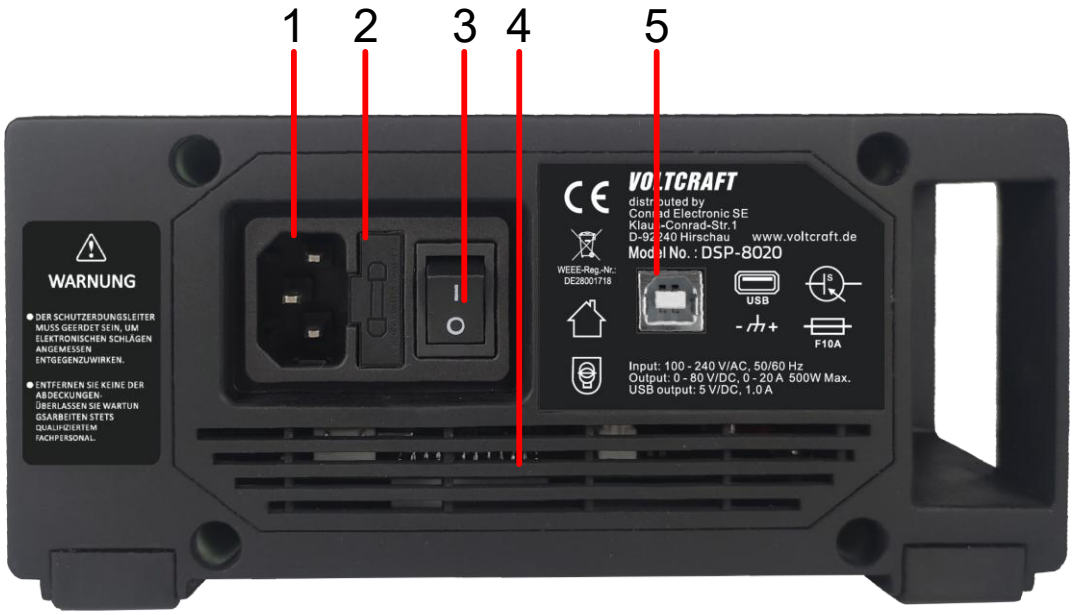


Figure 3-2 Rear Panel Overview

1	AC Power Input Jack	AC power input interface.
2	Fuse	Power fuse.
3	Power Button	Turn on/off the instrument.
4	Air Vent	Air vent.
5	USB Port	Update the firmware, PC software control port.

3.1.3 User Interface

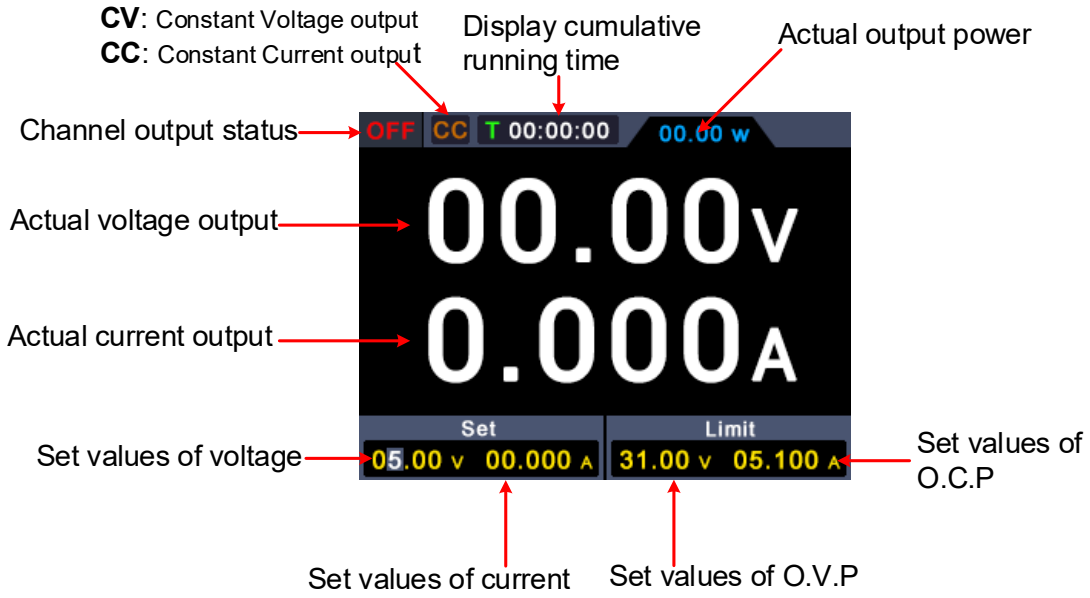


Figure 3-3 User Interface

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 it 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 key light flashes and the screen displays the measurement interface.

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.When it is set to the maximum or minimum,a beep is heard, indicating that the limit has been reached.

3.4.2 Current Output Inspection

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

(1) 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.

(2) Set the output voltage to the maximum rating on this channel.

(3) Turn on the channel output. Ensure the channel you used is in Constant Current output mode.

(4) 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.

(5) Check that if the output current can be adjusted from zero to the maximum rating, When it is set to the maximum or minimum, a beep is heard, indicating that the limit has been reached.

(6) Turn off the channel output and remove the short circuit from the output terminals.

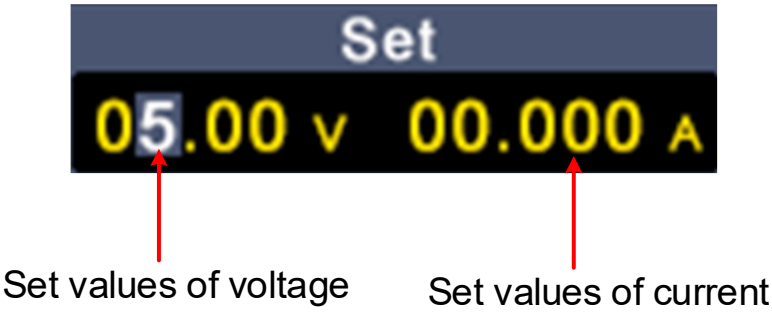
4. Panel Operation

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 the **V** / **I** key to move the blue cursor between different positions of the voltage/current value. After pressing the output voltage/current setting value, turn the **knob** to change the value of the current cursor, and press the **knob** or press the **V** / **I** key to move the cursor.



4.3 Over Voltage/Current Protection

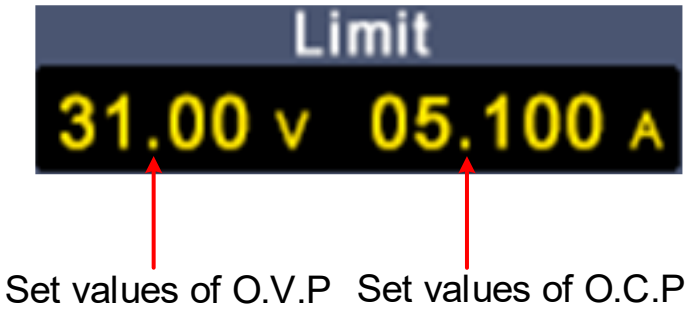
Overvoltage protection (O.V.P) or overcurrent protection (O.C.P): after the output is turned on, once the output voltage/current reaches the set value of O.V.P/O.C.P, the instrument will cut off the output, a warning will show on the screen.

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 the **OVP** / **OCP** keys to move the blue cursor between parameters. After selecting the overvoltage/overcurrent

protection value, turn the **knob** to change the current cursor value, and press the **OVP** / **OCP** direction key to move the cursor position.



Note: When output current larger than 10A, DO NOT use banana plug connect through output terminal !

4.4 Memory key shortcut settings

Press the **Memory** key on the front panel to store 4 sets of channel parameters M1, M2, M3, and M4 respectively for quick output.

4.4.1 Quick output

To output a set of parameters from M1 to M4, follow these steps:

(1) Press **Memory** key on front panel, the shortcut interface will display.

(2) Turn the **knob** to move the purpose selection box.

(3) After selecting the certain parameter, long press the **knob** to confirm the input value.



4.4.2 Edit

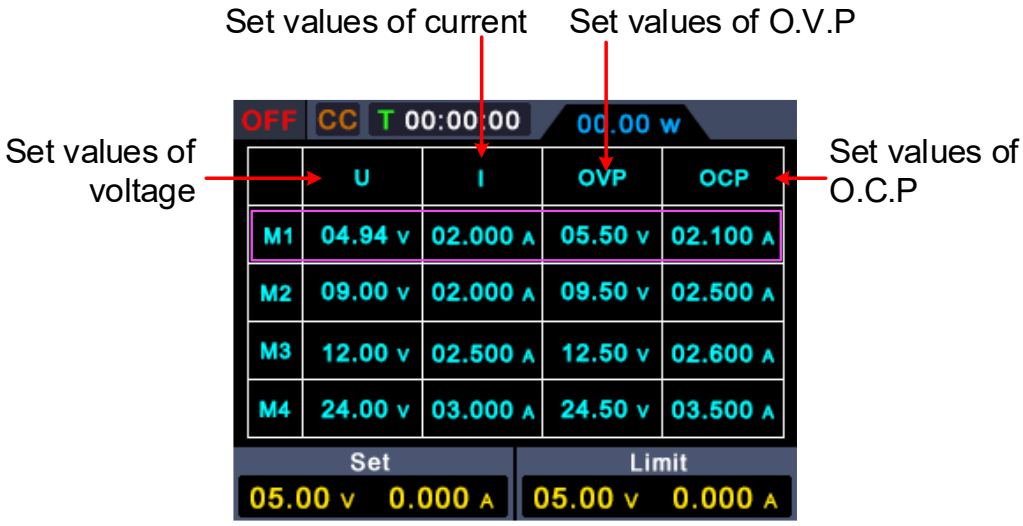
To edit the channel parameters of M1 to M4, follow these steps:

(1) Press **Memory** key on front panel, the shortcut interface will display.

(2) Turn the **knob** to move the purpose selection box.

(3) Press the **V** / **I** / **OVP** / **OCP** key to set the voltage / current / over voltage protection / over current protection value.

(4) Turn the **knob** to change the value of the current cursor, press the **knob** or press the **V** / **I** / **OVP** / **OCP** key to move the cursor.



4.5 Set List Waveform Output

The user can edit and output the waveform. A set of waveforms contains 10 editable points. The four editable parameters of each point include output voltage, output current, waveform duration and whether the point is selected. When the editing is completed, the instrument can output the expected waveform according to the time sequence edited by the user.

4.5.1 List waveform editing

To edit the List output waveform, the steps are as follows:

（**1**） Long press the **Memory** function key on the front panel for 3 seconds to enter the "List waveform editing interface";

（**2**） In the non-parameter setting state, turn the **knob** to display a purpose selection frame and you can select the editable point；

（**3**） Press the **V** / **I** / **OVP** / **OCP** key to enter the parameter setting state, and set the U/ I / T / Y/N；

（4） In the parameter setting state, turn the **knob** to change the value of the current cursor, press the **knob** or press the **V** / **I** / **OVP** / **OCP** key to move the cursor position; short press the **Memory** function key on the front panel to exit the parameter setting status；

（5） In the non-parameter setting state, press the **knob** for 3 seconds to confirm, enter the "List Waveform Output Mode", and at the same time, switch back to the main interface;

（6） Long press the **Memory** function key on the front panel for 3 seconds to exit the "List waveform editing interface".



4.5.2 List waveform output

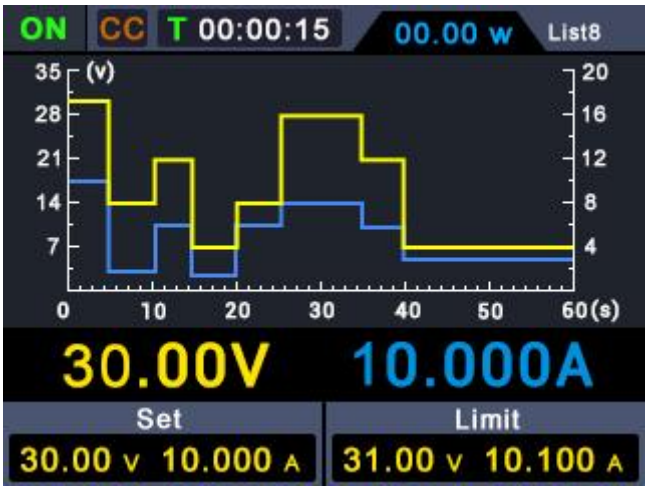
To perform List waveform output, the steps are as follows:

（1） Follow the steps described in 4.5.1 to edit the List waveform.

（2） Enter "List output mode", at this time, the first point of the List waveform pre-output is displayed in the upper right corner, such as "List8".

（3） Short press the **On/Off** function key on the front panel, the instrument will output according to the List editing time sequence, and the status bar at the top of the main interface will display the current List output point and the countdown of the duration of this point.

（4） In the List output mode, press and hold the **Memory** function key on the front panel for 3 seconds to exit the "List output mode".

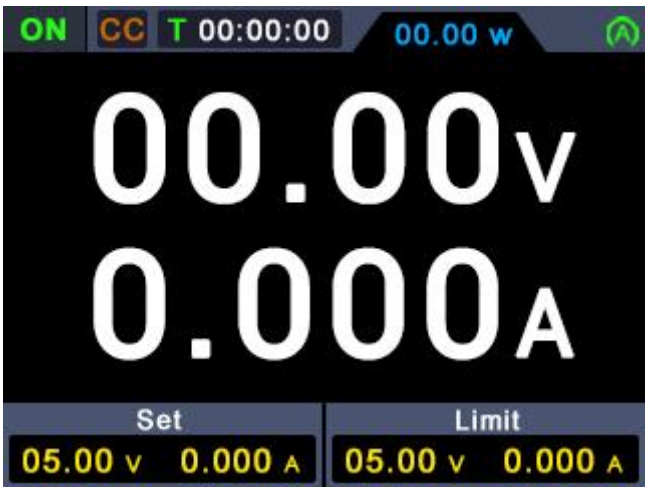


4.6 Set Automatic Output at Power-on

The user can turn on or turn off the "automatic output at power-on" function by pressing and holding the **On/Off** function key for 3 seconds.

（1） The steps are as follows The user can turn on or turn off the "automatic output at power-on" function by pressing and holding the **On/Off** function key for 3 seconds. The steps are as follows:

（2） When the "automatic output at power-on" is turned off, after power-on, the instrument is in the standby state. The user needs to manually perform the "On/Off" operation, then the instrument will output.

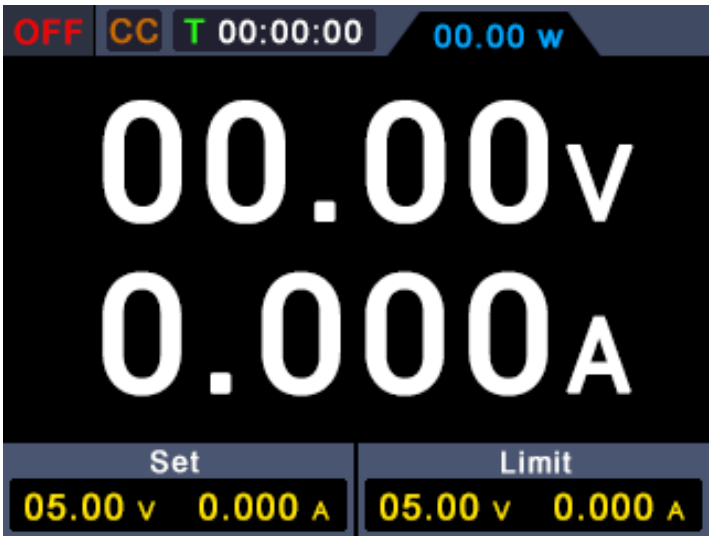


4.7 Display

Press the **Display** function key to choose to display the measurement data in number or curve.

4.7.1 Number

Press the **Display** function key to set the display mode to Number. When the power supply is powered on, the default display mode is Curve.



4.7.2 Curve

Press the **Display** function key to set the display mode to Curve.



5. Troubleshooting

1. **The instrument is powered on but no Display.**

- Check if the power is connected properly.
- Check if the fuse which is below the AC Power socket is used appropriately and in good condition (the cover can be pried open with a straight screwdriver).
- Restart the instrument after the steps above.
- If the problem still exists, please contact us for our service.

2. **The output is abnormal:**

- Check if the output voltage is set to 0V. If so, set it to other value.
- Check if the output current is set to 0A. If so, set it to other value.
- When in programmable output status, check if there is any voltage/current value is set to 0. If so, set it to other value.
- If the problem still exists, please contact us for our service.

6. Technical Specification

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

Model	DSP-8020	DSP-15010	DSP-30005
Input Characteristics			
Supply Voltage	100V-240V		
Input Frequency	50/60 Hz		
Input Fuse	250V, F10A		
Rated Output			
Voltage	0~80V	0~150V	0~300V
Current	0~20A	0~10A	0~5A
Power	500W	500W	500W
Regulation(CV)			
Load	≤20mV	≤20mV	≤30mV
Line	≤20mV	≤20mV	≤30mV
Regulation(CC)			
Load	≤10mA	≤10mA	≤10mA
Line	≤10mA	≤10mA	≤10mA
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)	≤50mVp-p	≤150mVp-p	≤300mVp-p
Current (rms)	≤20mA	≤30mA	≤30mA
Setting Resolution			
Voltage	10mV	10mV	10mV
Current	1mA	1mA	1mA
Readback Resolution			
Voltage	10mV	10mV	10mV
Current	1mA	1mA	1mA
Setting Accuracy			
Voltage	≤0.05%±20mV	≤0.05%±20mV	≤0.05%±200mV
Current	≤0.05%±20mA	≤0.05%±20mA	≤0.05%±20mA
Readback Accuracy			
Voltage	≤0.05%±20mV	≤0.05%±20mV	≤0.05%±200mV

Model	DSP-8020	DSP-15010	DSP-30005
Current	≤0.05%±20mA	≤0.05%±20mA	≤0.05%±20mA
Response time			
Transient recovery time (10%~90% rated load)	≤5.0ms		
Protective function			
OVP	0~85V	0~155V	0~310V
OCP	0~21A	0~11A	0~6A
OTP	85℃	85℃	85℃
Temperature coefficient of output			
Voltage	100ppm/℃		
Current	200ppm/℃		
Temperature coefficient of readback value			
Voltage	100ppm/℃		
Current	200ppm/℃		
Display			
Display Type	2.8-inch color LCD display (IPS screen)		
Resolution	240 × 320 pixels		
Color	65536 color,TFT		
Environment			
Temperature	Working Temperature: 0℃～40℃ Storage Temperature: -20℃～60℃		
Relative Humidity	Operation humidity: 20% to 90% RH; No condensation Storage humidity: 20% to 90% RH; No condensation		
Height	2,000 meters		
Cooling	Fan cooling, temperature intelligent speed control		
Other			
Communication Port	USB communication, compatible with SCPI		
Dimension	200mm(Width)× 92mm(Height)×185mm(Depth)		
Weight	Approx. 1.5 kg	Approx. 1.6 kg	Approx. 1.6 kg

7. Appendix

7.1 Appendix A:Accessories

(The accessories subject to final delivery.)

Standard:

- Power Cord
- User manual EN
- User manual DE
- Safety hintsheet
- Fuse
- USB Cable

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.



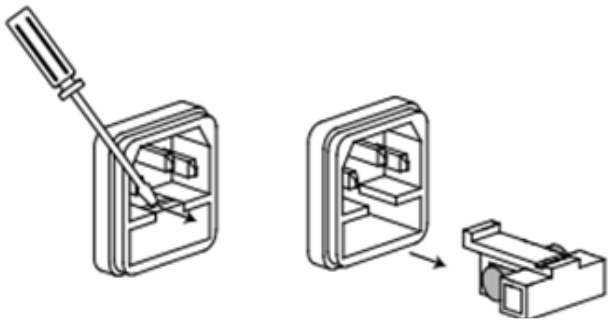
Warning: Before re-applying power, ensure that the instrument is completely dry, avoiding any electric shock or electrical short circuit resulting from moisture.

7.3 Appendix C: Line Fuse Replacement

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

To perform the line fuse replacement, follow these steps:

1. Turn off the power supply, 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.

